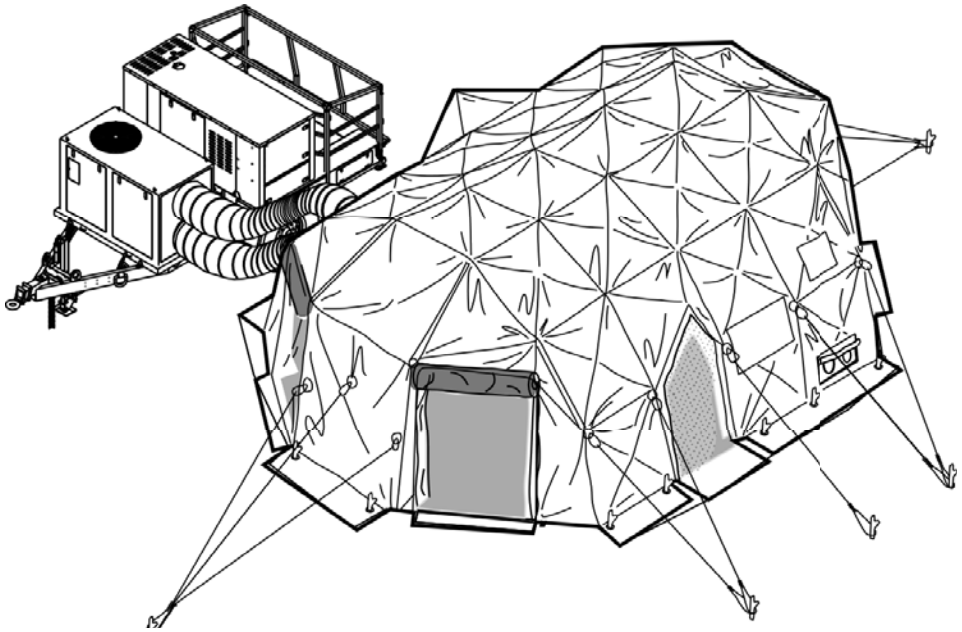
*TM 11-6115-742-13&P

TECHNICAL MANUAL

OPERATOR AND FIELD MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST FOR

POWER PLANT, UTILITY

PU-821/T (NSN 6115-01-547-6713) (EIC YVC)
PU-822A/T (NSN 6115-01-547-6738) (EIC YVB)



*TM 11-6115-742-13&P dated 30 MAY 2012, including all changes, supersedes TM 11-6115-742-13&P dated 15 October 2008.

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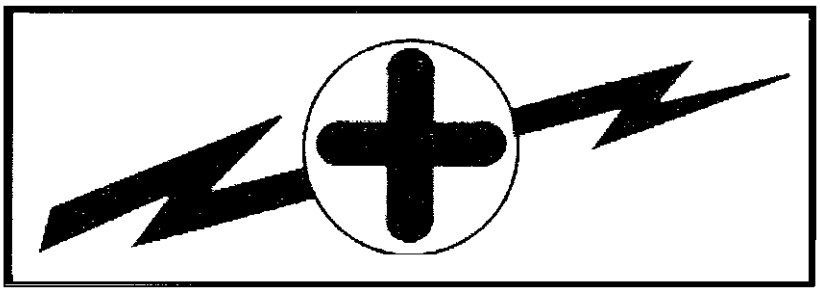
HEADQUARTERS, DEPARTMENT OF THE ARMY

30 MAY 2012

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS VICTIM OF ELECTRICAL SHOCK.

1. SEND FOR HELP AS SOON AS POSSIBLE.
2. DO NOT TRY TO PULL OR GRAB INDIVIDUAL.
3. IF POSSIBLE, TURN OFF ELECTRICAL POWER.
4. IF YOU CANNOT TURN OFF ELECTRICAL POWER, PULL, PUSH, OR LIFT PERSON TO SAFETY USING A DRY WOODEN POLE, A DRY ROPE, OR SOME OTHER INSULATING MATERIAL.
5. AFTER INJURED PERSON IS FREE OF CONTACT WITH SOURCE OF ELECTRICAL SHOCK, MOVE PERSON A SHORT DISTANCE AWAY. IMMEDIATELY START ARTIFICIAL RESUSCITATION.

WARNING



HIGH VOLTAGE
is used in operation of this equipment.

DEATH ON CONTACT
may result if personnel fail to observe safety precautions.

Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of the equipment and who is competent in administering first aid. When operators aid the technician, the technician must warn operators about dangerous areas.

When possible, shut off power supply to equipment before beginning work on equipment. Take particular care to ground every capacitor that could potentially store a dangerous electrical charge. Turn off power when working inside equipment. Always ground every part of equipment before touching it.

Be careful not to contact high-voltage connections or 115 VAC input connections when installing or operating equipment.

Whenever the nature of operation permits, keep one hand away from equipment to reduce hazard of current flowing through the body.

WARNING: Do not be misled by the term “low voltage.” Under adverse conditions, potentials as low as 50 volts may cause death.

For Artificial Respiration, refer to FM 4-25.11.

ELECTRICAL HAZARD

Under adverse conditions, voltage used in this equipment can cause death or serious injury. Observe the following safety precautions:

GROUND THE EQUIPMENT — Before connecting primary power cables, connect grounding cable from ground lug on power control box to earth ground. Do not remove grounding cable until signal cables and primary power cables have been disconnected and Genset has been shut down.

AVOID THE POWER INPUT — Be careful not to contact 208/115 VAC connections when installing or servicing equipment.

DO NOT SERVICE ALONE — Never work on equipment unless there is another person nearby who is familiar with operation and hazards of equipment and who can administer first aid.

USE ONLY ONE HAND — Whenever possible, use only one hand to service equipment. Keep other hand away to reduce hazard of current flowing through vital organs of the body.

WARNING

BURN HAZARD

Equipment and Genset may be hot to touch. Allow unit to cool before handling or use gloves when handling. Serious injury or death from burns or scalding could result from contact with high-pressure steam and/or liquid. Failure to observe this warning can result in serious injury.

WARNING

HIGH VOLTAGE

RF energy is present near the antenna during transmission. Touching the antenna during transmission may result in death or serious injury. Maintain at least 30 inches between vehicular antennas and personnel during transmissions.

WARNING

Death or serious injuries can result:

- When antenna tip caps are not installed on antennas.
- When an antenna is not tied down, it could hit a fixed object such as an overhead bridge, tree limb, etc. Antenna could break, and flying antenna parts might strike nearby personnel.

WARNING

HEAVY EQUIPMENT

Improperly lifting or carrying heavy equipment can result in serious injury or death. Refer to the following weight limits as guidelines:

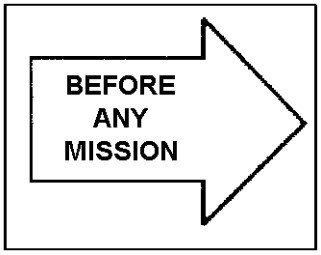
Handling Function	One-Person Max. Lift	Two-Person Max. Lift	Two-Person Max. Lift (Male Only)
Lift object from floor and place it on surface not greater than 5 feet above floor.	37 lb.	74 lb.	112 lb.
Lift object from floor and place it on surface not greater than 3 feet above floor.	44 lb.	88 lb.	174 lb.
Carry object 33 feet or less.	42 lb.	84 lb.	164 lb.

WARNING

The ECU for the TMSS-MED weighs 1150 lbs. Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the ECU without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

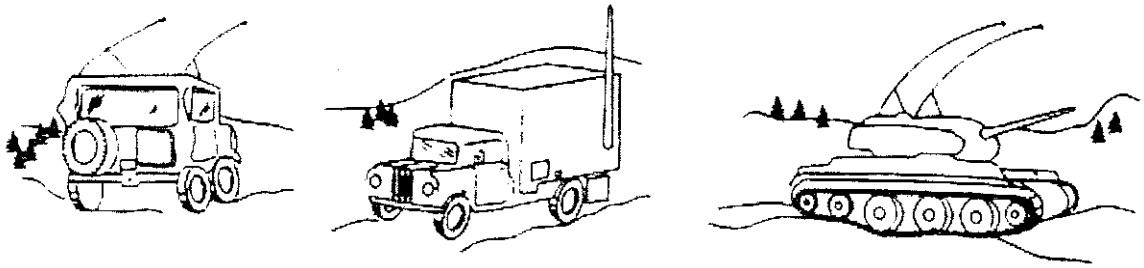
WARNING

SERIOUS INJURY OR DEATH CAN RESULT IF THE FOLLOWING ARE NOT CAREFULLY OBSERVED WHEN INSTALLING AND USING THE ANTENNAS USED WITH YOUR RADIO SETS.



1. **ARE THERE ANY POWER LINES IN YOUR AREA OF OPERATION?**
2. **HOW HIGH ARE THESE POWER LINES?**
3. **HOW TALL ARE POLES OR TOWERS CARRYING POWER LINES?**

MOBILE OPERATION WITH WHIP ANTENNAS

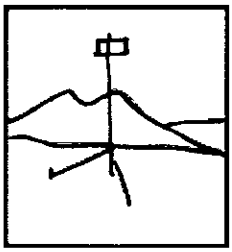


DO NOT STOP YOUR VEHICLE UNDER POWER LINES

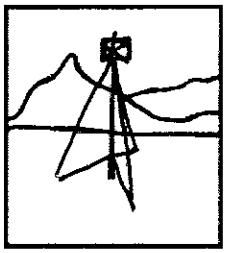
- If possible, try to maintain mobile communications with your antenna(s) tied down.
- Make sure an antenna tip cap is securely taped on end of each whip antenna.
- Do not lean against or touch a whip antenna while transmitter is on.
- During cross-country operation, do not allow anyone to stick an arm, leg, or weapon over sides of vehicle. Serious or fatal accident can occur if your antenna accidentally touches a power line, and a leg, arm, or weapon contacts a damp bush or a ground.
- If you are not sure that an antenna or your vehicle will clear a power line, stop before you get close to the power line. Carefully tie down antenna or remove antenna sections to make sure that you can drive safely under power line.
- Do not climb on top of vehicle or shelter during radio transmissions.

FIXED OPERATION WITH LONG-RANGE ANTENNAS

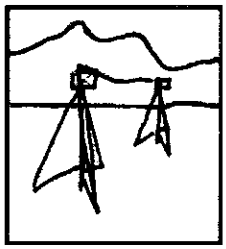
WARNING



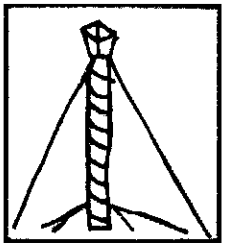
TELESCOPING ANTENNA MAST



EXTENDED RANGE ANTENNA



DOUBLET ANTENNA



TYPICAL TOWER

NEVER RAISE LONG-RANGE ANTENNAS DIRECTLY UNDER POWER LINES

If you raise long-range antennas near power lines, power line poles, towers, or buildings with overhead power line connections, never put the antenna closer than two times the antenna height to the base of the power line, pole, tower, or buildings.

NEVER RAISE ANY LONG-RANGE ANTENNA WITHOUT A FULL TEAM

Before raising a long-range antenna, inspect all of the parts making up the antenna kit. Do not raise the antenna if any parts are missing or damaged.

Do as much of the assembly work as possible on the ground.

When raising the antenna, allow only team personnel in the area.

Make sure that the area you use for the anchors is firm. If the ground is marshy or sandy, get specific instructions from your crew chief or supervisor on how to reinforce the anchors.

When selecting locations for anchors, avoid traveled areas and roads. If you cannot avoid these areas, get specific instructions from your supervisor as to what clearance your guy wires must have over the traveled areas and road.

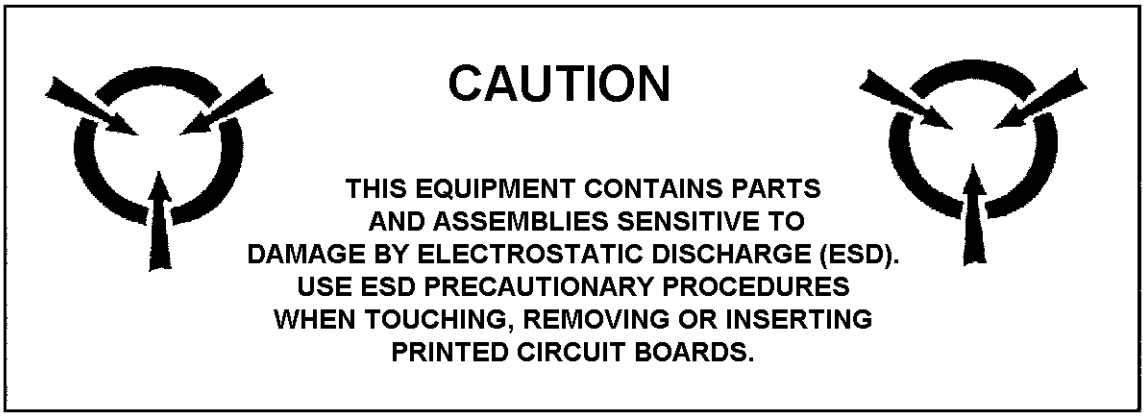
Clearly mark all guy wires and ropes with the warning flags or signs supplied by your unit. In an emergency, use strips of white cloth as warning streamers.

If you suspect that power lines have made accidental contact with your antenna, stop operations, rope off the antenna area, and notify your superiors.

If weather in your area can cause ice to form on your long-range antenna and its guy wires and ropes, add extra guys to support the system. Rope off the area and post it with warning signs like “BEWARE OF FALLING ICE.”

Do not try to raise any antenna during an electrical storm.

Closely monitor your anchors and guys. Check them daily and immediately before and after bad weather.



ESD

CLASS 1

GENERAL HANDLING PROCEDURES FOR ESD ITEMS

- USE WRIST GROUND STRAPS OR MANUAL GROUNDING PROCEDURES.
- KEEP ESD ITEMS IN PROTECTIVE COVERING WHEN NOT IN USE.
- GROUND ALL ELECTRICAL TOOLS AND TEST EQUIPMENT.
- PERIODICALLY CHECK CONTINUITY AND RESISTANCE OF GROUNDING SYSTEM.
- USE ONLY METALIZED SOLDER SUCKERS.
- HANDLE ESD ITEMS IN PROTECTED AREAS ONLY.

MANUAL GROUNDING PROCEDURES

- MAKE CERTAIN EQUIPMENT IS POWERED DOWN.
- TOUCH GROUND PRIOR TO REMOVING ESD ITEMS.
- TOUCH PACKAGE OR REPLACEMENT ESD ITEM TO GROUND BEFORE OPENING.
- TOUCH GROUND PRIOR TO INSERTING REPLACEMENT ESD ITEMS.

ESD PROTECTIVE PACKAGING AND LABELING

- COVER ANTISTATIC MATERIAL WITH AN OUTER WRAP OF EITHER TYPE 1 ALUMINIZED MATERIAL OR CONDUCTIVE PLASTIC FILM OR HYBRID LAMINATED BAGS HAVING AN INTERIOR OF ANTISTATIC MATERIAL WITH AN OUTER METALIZED LAYER.
- LABEL WITH SENSITIVE ELECTRONIC SYMBOL AND CAUTION NOTE.

WARNING

Lithium-Sulfur Dioxide Non-Rechargeable Batteries

Lithium-Sulfur Dioxide ($LiSO^2$) batteries have been designed to provide a safe, high-capacity power source in a relatively small lightweight package. However, if misused or abused, these batteries can be dangerous.

$LiSO^2$ batteries contain liquefied sulfur dioxide (corrosive causes burns to the skin), acetonitrile (mildly toxic), and lithium metal (extremely reactive and flammable). All $LiSO^2$ batteries have multiple safety features to contain these hazards.

Store $LiSO^2$ batteries at temperatures below 130ºF. Segregate different battery chemistries from each other.

Keep batteries in original packaging until ready for use. Examine packages/batteries for bulging, cracking, or any signs of leakage before putting batteries into equipment. Use only appropriate batteries for each particular item.

When replacing batteries in equipment containing more than one $LiSO^2$ battery, replace all $LiSO^2$ batteries at the same time. Replace with batteries from same contract number and date code only.

Never charge a $LiSO^2$ battery.

Never short-circuit terminals.

Remove batteries from equipment if it is not to be used within 30 days.

Depleted batteries should be turned in to designated personnel for disposal processing (CDD activation) and disposal in accordance with local regulations or through Defense Reutilization and Marketing Office.

In event of a venting, clear area until pungent odor of sulfur dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

Refer to TB 43-0134, Battery Disposition and Disposal, for additional information.

DO NOT mix primary and rechargeable batteries in equipment, such as BA-5590/U and the BB-390A/U batteries.

When using $LiSO^2$ batteries, immediately power down equipment and replace with new batteries upon low power indication.

WARNING

Compressed air is dangerous and can cause serious bodily harm. Protective means or methods should be observed to prevent a chip or particle (of any size) from being blown into eyes or skin of operator or other personnel. Do not use compressed air for cleaning purposes unless you can reduce it to less than 30 pounds per square inch gauge (30 psig) and then only with effective chip guarding and personnel protective equipment (industrial safety glasses and full face shield).

WARNING

Trichlorotrifluoroethane, trichloroethane, and similar chemical solvents threaten public health and the environment by destroying ozone in earth's upper atmosphere. Use only nonhazardous cleaning material such as a clean cloth, water, and mild detergent.

WARNING

Grounding TMSS-MED equipment is essential to prevent serious electrical shock or even death. Most favorable TMSS-MED grounding is achieved when TMSS-MED trailer is directly connected via proper sized grounding wire to ground rod assembly. Refer to “Earth Grounding and Bonding Pamphlet”, CECOM TR-98-6, Oct 1998 for more detailed information on grounding equipment.

WARNING

To avoid possible electrical shock, ensure that grounding cables from ground lugs are connected to GROUND on frame of TMSS prior to power up. Do not remove grounding cable while powered up.

WARNING

To avoid possible electrical shock, do not remove grounding cable until signal cables and primary power cables have been disconnected.

WARNING

Eye protection and gloves are required for deploying and removing TMSS-MED grounding. Notify service level maintenance of any mushroomed stake heads. Visually inspect all cable before handling. Use gloves when handling cable.

WARNING

If a circuit breaker does not stay in ON position when closed, DO NOT attempt to close it repeatedly. That could create an overload situation hazardous to personnel and equipment. Investigate and identify cause of problem. Correct situation before attempting to close breaker again.

WARNING

To avoid electrical shock and damage to equipment, be certain POWER ON/OFF circuit breaker is set to OFF and power cable is disconnected at power source before disconnecting signal cables.

WARNING

Fiber-optic cables can be degraded or damaged by dust, dirt, oils, and misalignment.

Use care to insert and remove connectors straight in and out without angling.
Keep cable connectors capped when not connected.

Do not connect dusty, dirty, or oily connectors.
Do not coil or knot cables tightly.

Never look into end of a fiber-optic cable or connector. Infrared (IR) signals can cause eye damage. Failure to observe this warning can cause damage to equipment or personal injury.

Heat or cold stress can occur under extreme temperature conditions. Follow TB MED 507, FM 21-10, and TB MED 508 for proper preventive measures.

WARNING

Hearing protection is required when within 8 feet of the Genset operating position.

WARNING

Items that may shatter (i.e., meters, displays, or any other type of glass or plastic) should be visually inspected prior to use to prevent potential injury from broken edges. Failure to observe this warning can result in serious injury.

WARNING

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury.

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any troubleshooting procedures.

WARNING

Critical fasteners used to secure equipment should be installed and periodically inspected for retention. Missing fasteners should be noted and replaced. Loose fasteners should be tightened. Failure to observe this warning can result in serious injury.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

WARNING

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before troubleshooting.

WARNING

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

WARNING

Diesel fuel is flammable. Do not fill fuel tank with engine running, while smoking, or when near an open flame. Never overfill tank or spill fuel. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death.

WARNING

BE AWARE: Nuclear, Biological, Chemical (NBC) protective masks will not protect from carbon monoxide poisoning.

WARNING

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present at the PDP. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

WARNING

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

WARNING

REFRIGERANT UNDER PRESSURE

WARNING

Death or severe injury may result if you fail to observe safety precautions. Never use a heating torch on any part of the system that contains refrigerant. Do not let liquid refrigerant touch you, and do not inhale refrigerant gas

WARNING

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

WARNING

Brazing alloys and flux contain materials that are hazardous to health. Avoid breathing vapors or fumes from brazing operations. Perform operations only in well ventilated areas. Wash hands with soap and water after handling brazing alloys and flux. Wear gloves and protective goggles or face shield to protect against burns.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

WARNING

Never use a heating torch on any part that contains refrigerant. Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. All refrigerant must be removed and recovered from the system and the entire system must be purged with dry nitrogen before beginning any brazing operation.

WARNING

Sudden and irreversible tissue damage can result from freezing. Wear gloves and a face protector or safety glasses in any situation where skin or eye contact with refrigerant is possible.

WARNING

Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. Prevent contact of refrigerant with flame or hot surfaces.

WARNING

Never introduce high discharge pressure into a refrigerant cylinder. This can cause the cylinder to rupture and injure personnel.

WARNING

Never introduce liquid refrigerant into the suction shut off valve. This can cause damage to the compressor.

WARNING

The system must be evacuated before charging. Moisture and air in the system will prevent the refrigeration unit from operating properly.

WARNING

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

WARNING

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

WARNING

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

WARNING

The Genset for the TMSS-MED weighs 1350 lbs (612.35 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the Genset without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

WARNING

Dry cleaning solvent MIL-PRF-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and DO NOT breath vapors. DO NOT use near open flame or excessive heat.

WARNING

Removing metal parts could be dangerous to personnel. Always wear eye protection when replacing wheel studs. Failure to follow this warning may result in injury to personnel.

WARNING

The cotter pin prevents the spindle nut from coming loose. Failure to install the cotter pin properly will cause the spindle nut to back off of the spindle causing loss of wheel assembly.

WARNING

Never replace only one brakeshoe. Combinations of old and new brakeshoes will cause uneven braking. Accidents causing serious injury or death to personnel or damage to equipment may result.

WARNING

DO NOT allow grease to contact brakeshoe linings. Wipe excess lubricant from the brakeshoe linings to prevent grease soaking into the materials. Brakeshoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

WARNING

When the following step is being performed, the trailer is in a very unstable position. This procedure should be performed in a timely manner and the trailer should not be left unattended. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

WARNING

Trailer may move during process. DO NOT lie under trailer while moving vehicle. Severe injury may result to personnel.

WARNING

Use caution when removing hydraulic push rod assembly due to spring tension.

WARNING

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves and use solvent only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F to 138°F (38°C to 59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

WARNING

Empty fuel tank weighs 33 pounds and may require two persons to safely remove to avoid injury to personnel.

WARNING

DO NOT handle brakeshoes, drum/hubs, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if touched or inhaled. Wear an approved filter mask and gloves.

WARNING

NEVER use compressed air or a dry brush to clean brake components. Injury may result.

WARNING

Hot coolant is under pressure. Opening the radiator while the coolant is hot can result in possible burns and damage to equipment.

WARNING

High voltage and amperage present at electrical connections. Do not enter ECU with power applied. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with ECU operating.

WARNING

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

WARNING

Ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

WARNING

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

WARNING

Tire and wheel assembly weigh in excess of 110 lbs. Removal and replacement require a two person lift to avoid injury to personnel.

WARNING

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury, or may short across electrical circuit and cause severe burns or electrical shock.

WARNING

Wear eye protection and gloves when hammering stakes and ground rod sections. Failure to observe this warning may result in injury to the eye or exposed skin from flying metal fragments.

WARNING

Cut end of air intake is extremely sharp. Exercise care to prevent injury.

WARNING

If heater has been operating exhaust may be extremely hot. Allow time to cool before removing.

WARNING

Cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations. Nitrogen is an inert gas. However, it also presents danger as a suffocant and, therefore, must be discharged in a ventilated location.

LIST OF EFFECTIVE PAGES/WORK PACKAGES

NOTE: Zero in the “Change No.” column indicates an original page or work package.

Date of issue for the original manual is:

Original: 30 May 2012

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 122 AND TOTAL NUMBER OF WORK PACKAGES IS 168, CONSISTING OF THE FOLLOWING:

Page/WP No.	Change No.	Page/WP No.	Change No.
Front Cover	0	Chp 5 title page	0
Blank	0	Blank	0
Warning summary (16 pgs)	0	WP 0027 (4 pgs)	0
i – xxx	0	WP 0028 (26 pgs)	0
Chp 1 title page	0	WP 0029 (32 pgs)	0
Blank	0	WP 0030 (30 pgs)	0
WP 0001 (6 pgs)	0	WP 0031 (6 pgs)	0
WP 0002 (10 pgs)	0	WP 0032 (4 pgs)	0
WP 0003 (22 pgs)	0	WP 0033 (4 pgs)	0
Chp 2 title page	0	WP 0034 (2 pgs)	0
Blank	0	Chp 6 title page	0
WP 0004 (12 pgs)	0	Blank	0
WP 0005 (46 pgs)	0	WP 0035 (2 pgs)	0
WP 0006 (12 pgs)	0	WP 0036 (4 pgs)	0
WP 0007 (2 pgs)	0	WP 0037 (4 pgs)	0
WP 0008 (12 pgs)	0	WP 0038 (2 pgs)	0
WP 0009 (4 pgs)	0	WP 0039 (14 pgs)	0
Chp 3 title page	0	WP 0040 (6 pgs)	0
Blank	0	WP 0041 (30 pgs)	0
WP 0010 (2 pgs)	0	WP 0042 (6 pgs)	0
WP 0011 (8 pgs)	0	WP 0043 (4 pgs)	0
WP 0012 (4 pgs)	0	WP 0044 (4 pgs)	0
WP 0013 (4 pgs)	0	WP 0045 (4 pgs)	0
WP 0014 (4 pgs)	0	WP 0046 (4 pgs)	0
WP 0015 (4 pgs)	0	WP 0047 (6 pgs)	0
WP 0016 (2 pgs)	0	WP 0048 (16 pgs)	0
Chp 4 title page	0	WP 0049 (6 pgs)	0
Blank	0	WP 0050 (4 pgs)	0
WP 0017 (2 pgs)	0	WP 0051 (4 pgs)	0
WP 0018 (4 pgs)	0	WP 0052 (10 pgs)	0
WP 0019 (12 pgs)	0	WP 0053 (4 pgs)	0
WP 0020 (4 pgs)	0	WP 0054 (6 pgs)	0
WP 0021 (8 pgs)	0	WP 0055 (4 pgs)	0
WP 0022 (6 pgs)	0	WP 0056 (4 pgs)	0
WP 0023 (6 pgs)	0	WP 0057 (6 pgs)	0
WP 0024 (6 pgs)	0	WP 0058 (6 pgs)	0
WP 0025 (6 pgs)	0	WP 0059 (8 pgs)	0
WP 0026 (8 pgs)	0	WP 0060 (4 pgs)	0

LIST OF EFFECTIVE PAGES/WORK PACKAGES - Continued

Page/WP No.	Change No.	Page/WP No.	Change No.
WP 0061 (6 pgs)	0	WP 0105 (4 pgs)	0
WP 0062 (6 pgs)	0	WP 0106 (4 pgs)	0
WP 0063 (6 pgs)	0	WP 0107 (6 pgs)	0
WP 0064 (20 pgs)	0	WP 0108 (4 pgs)	0
WP 0065 (8 pgs)	0	WP 0109 (6 pgs)	0
WP 0066 (4 pgs)	0	WP 0110 (6 pgs)	0
WP 0067 (6 pgs)	0	WP 0111 (4 pgs)	0
WP 0068 (4 pgs)	0	WP 0112 (4 pgs)	0
WP 0069 (8 pgs)	0	WP 0113 (8 pgs)	0
WP 0070 (12 pgs)	0	WP 0114 (4 pgs)	0
WP 0071 (6 pgs)	0	Chp 8 title page	0
WP 0072 (6 pgs)	0	Blank	0
WP 0073 (4 pgs)	0	WP 0115 (2 pgs)	0
WP 0074 (24 pgs)	0	WP 0116 (4 pgs)	0
WP 0075 (4 pgs)	0	WP 0117 (4 pgs)	0
WP 0076 (4 pgs)	0	WP 0118 (2 pgs)	0
WP 0077 (4 pgs)	0	WP 0119 (6 pgs)	0
WP 0078 (4 pgs)	0	WP 0120 (4 pgs)	0
WP 0079 (6 pgs)	0	WP 0121 (6 pgs)	0
WP 0080 (4 pgs)	0	WP 0122 (10 pgs)	0
WP 0081 (10 pgs)	0	WP 0123 (4 pgs)	0
WP 0082 (4 pgs)	0	WP 0124 (8 pgs)	0
WP 0083 (4 pgs)	0	WP 0125 (6 pgs)	0
WP 0084 (8 pgs)	0	WP 0126 (18 pgs)	0
WP 0085 (14 pgs)	0	WP 0127 (10 pgs)	0
WP 0086 (30 pgs)	0	WP 0128 (16 pgs)	0
Chp 7 title page	0	WP 0129 (6 pgs)	0
Blank	0	WP 0130 (6 pgs)	0
WP 0087 (2 pgs)	0	Chp 9 title page	0
WP 0088 (4 pgs)	0	Blank	0
WP 0089 (2 pgs)	0	WP 0131 (6 pgs)	0
WP 0090 (2 pgs)	0	WP 0132 (4 pgs)	0
WP 0091 (4 pgs)	0	WP 0133 (4 pgs)	0
WP 0092 (6 pgs)	0	WP 0134 (4 pgs)	0
WP 0093 (10 pgs)	0	WP 0135 (10 pgs)	0
WP 0094 (14 pgs)	0	WP 0136 (4 pgs)	0
WP 0095 (10 pgs)	0	WP 0137 (14 pgs)	0
WP 0096 (8 pgs)	0	WP 0138 (4 pgs)	0
WP 0097 (4 pgs)	0	WP 0139 (14 pgs)	0
WP 0098 (6 pgs)	0	WP 0140 (4 pgs)	0
WP 0099 (8 pgs)	0	WP 0141 (10 pgs)	0
WP 0100 (20 pgs)	0	WP 0142 (4 pgs)	0
WP 0101 (4 pgs)	0	WP 0143 (4 pgs)	0
WP 0102 (4 pgs)	0	WP 0144 (4 pgs)	0
WP 0103 (10 pgs)	0	WP 0145 (4 pgs)	0
WP 0104 (6 pgs)	0	WP 0146 (6 pgs)	0

LIST OF EFFECTIVE PAGES/WORK PACKAGES - Continued

Page/WP No.	Change No.	Page/WP No.	Change No.
WP 0147 (6 pgs)	0		
WP 0148 (10 pgs)	0	FP-15	0
WP 0149 (8 pgs)	0	FP-16 blank	0
WP 0150 (4 pgs)	0	FP-17	0
WP 0151 (4 pgs)	0	FP-18 blank	0
WP 0152 (6 pgs)	0	FP-19	0
WP 0153 (4 pgs)	0	FP-20 blank	0
WP 0154 (6 pgs)	0	FP-21	0
WP 0155 (6 pgs)	0	FP-22 blank	0
WP 0156 (4 pgs)	0	FP-23	0
WP 0157 (4 pgs)	0	FP-24 blank	0
WP 0158 (4 pgs)	0	FP-25	0
WP 0159 (6 pgs)	0	FP-26 blank	0
WP 0160 (10 pgs)	0	FP-27	0
Chp 10 title page	0	FP-28 blank	0
Blank	0	FP-29	0
WP 0161 (2 pgs)	0	FP-30 blank	0
WP 0162 (2 pgs)	0	FP-31	0
Chp 11 title page	0	FP-32 blank	0
Blank	0	FP-33	0
WP 0163 (2 pgs)	0	FP-34 blank	0
WP 0164 (4 pgs)	0	FP-35	0
WP 0165 (6 pgs)	0	FP-36 blank	0
WP 0166 (10 pgs)	0	FP-37	0
WP 0167 (4 pgs)	0	FP-38 blank	0
WP 0168 (6 pgs)		FP-39	0
INDEX-1 – INDEX-16		FP-40 blank	0
FP-1		FP-41	0
FP-2 blank		FP-42 blank	0
FP-3	0	FP-43	0
FP-4 blank	0	FP-44 blank	0
FP-5	0	Inside back cover	0
FP-6 blank	0	Back cover	0
FP-7	0		
FP-8 blank	0		
FP-9	0		
FP-10 blank	0		
FP-11	0		
FP-12 blank	0		
FP-13	0		
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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 May 2012

TECHNICAL MANUAL

OPERATOR AND FIELD MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST FOR

POWER PLANT, UTILITY

PU-821/T (NSN 6115-01-547-6713) (EIC YVC)
PU-822A/T (NSN 6115-01-547-6738) (EIC YVB)

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TABLE OF CONTENTS

Page No.
WP Sequence No.

How to Use This Manual

Chapter 1 – General Information, Equipment Description, and Theory of Operation for TMSS-MED

General Information ..... WP 0001

Figure 1. TMSS-MED System Configuration ..... WP 0001-1

Table 1. Nomenclature Cross-Reference List ..... WP 0001-3

Table 2. Abbreviation/Acronym List ..... WP 0001-4

Equipment Description and Data ..... WP 0002

Figure 1. TMSS-MED Configuration ..... WP 0002-1

Figure 2. TMSS-MED Shelter Components ..... WP 0002-2

Figure 3. TMSS-MED Trailer Major Components ..... WP 0002-3

Figure 4. TMSS-MED Genset ..... WP 0002-4

Figure 5. TMSS-MED ECU ..... WP 0002-5

Figure 6. TMSS-MED Cargo Bay ..... WP 0002-5

Figure 7. TMSS-MED Chassis ..... WP 0002-6

Figure 8. TMSS-MED PDU ..... WP 0002-6

Figure 9. TMSS-MED Tent Lighting Set ..... WP 0002-7

Theory of Operation ..... WP 0003

Figure 1. Genset Fault System ..... WP 0003-3

Figure 2. Fuel System ..... WP 0003-5

Figure 3. Engine Heater Flow Diagram ..... WP 0003-6

Figure 4. Engine Coolant System. ..... WP 0003-7

Figure 5. Engine Lubrication System ..... WP 0003-8

Figure 6. Output Supply System ..... WP 0003-10

Figure 7. Barrier Panel Component Location ..... WP 0003-11

Figure 8. Governor Control System... ..... WP 0003-12

Figure 9. Battery Charging System ..... WP 0003-13

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Theory of Operation – Continued ..... WP 0003

Figure 10. ECU (Version 1) Control Panel Component Location ..... WP 0003-15

Figure 11. Power Distribution/Fault System (Version 1). ..... WP 0003-16

Figure 12. ECU (Version 2) Control Panel Component Location ..... WP 0003-17

Figure 13. Power Distribution/Fault System (Version 2) ..... WP 0003-18

Chapter 2 – Operator Instructions

Description and Use of Operator Controls, Indicators, and Connectors ..... WP 0004

Figure 1. Genset Control Panel (Top Panel) – Controls, Indicators, and Connectors .... WP 0004-1

Table 1. Genset Control Panel (Top Panel) – Controls, Indicators, and Connectors ..... WP 0004-1

Figure 2. Genset Control Panel (Bottom Panel) – Controls, Indicators, and Connectors ..... WP 0004-3

Table 2. Genset Control Panel (Bottom Panel) – Controls, Indicators, and Connectors ..... WP 0004-3

Figure 3. Genset Power Distribution Panel – Controls, Indicators, and Connectors ..... WP 0004-4

Table 3. Genset Power Distribution Panel – Controls, Indicators, and Connectors ..... WP 0004-4

Figure 4. Fuel Control Panel – Controls, Indicators, and Connectors ..... WP 0004-5

Table 4. Fuel Control Panel – Controls, Indicators, and Connectors ..... WP 0004-5

Figure 5. Fuel Gauge – Controls, Indicators, and Connectors ..... WP 0004-6

Table 5. Fuel Gauge – Controls, Indicators, and Connectors ..... WP 0004-6

Figure 6. ECU Control Panel – Controls, Indicators, and Connectors ..... WP 0004-7

Table 6. ECU Control Panel – Controls, Indicators, and Connectors ..... WP 0004-7

Figure 7. PDU Control Panel – Controls, Indicators, and Connectors ..... WP 0004-9

Table 7. PDU Control Panel – Controls, Indicators, and Connectors ..... WP 0004-9

Figure 8. Power Distribution Panel - Controls, Indicators, and Connectors (Updated Version) ..... WP 0004-11

Table 8. Power Distribution Panel - Controls, Indicators, and Connectors (Updated Version) ..... WP 0004-11

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Operation Under Usual Conditions ..... WP 0005

Figure 1. TMSS-MED System Deployment Footprint ..... WP 0005-1

Figure 2. Shelter Site Dimensions ..... WP 0005-2

Figure 3. Correct Trailer Operating Positions ..... WP 0005-3

Figure 4. Wheel/Skid Plate Assembly Mounting Positions ..... WP 0005-4

Figure 5. Wheel Chocks ..... WP 0005-5

Figure 6. Remove the Crossbar ..... WP 0005-7

Figure 7. Remove and Position Shelter End Caps ..... WP 0005-8

Figure 8. Lower Shelter Transport Bag to Ground ..... WP 0005-9

Figure 9. Expand and Lift Shelter ..... WP 0005-10

Figure 10. Red Flag Locations ..... WP 0005-11

Figure 11. Shelter Resting on Four Push Poles ..... WP 0005-11

Figure 12. Position of Additional Red Flagged Keepers ..... WP 0005-12

Figure 13. Position End Caps Next to Center Section ..... WP 0005-13

Figure 14. Secure End Cap Frame to Center Section Frame ..... WP 0005-13

Figure 15. Secure End Cap Covers to Center Section Covers ..... WP 0005-14

Figure 16. Shelter in Erected Position ..... WP 0005-15

Figure 17. Shelter Lift Locations ..... WP 0005-16

Figure 18. Attach Floor to Shelter ..... WP 0005-17

Figure 19. Shelter Installation Complete ..... WP 0005-18

Figure 20. Connect Ducts to Shelter ..... WP 0005-19

Figure 21. Typical Shelter Lighting Arrangement ..... WP 0005-20

Figure 22. Location of PDU with Respect to Trailer and Shelter ..... WP 0005-22

Figure 23. Location of Fuel Control Panel ..... WP 0005-24

Figure 24. Aux Fuel Lines to External Fuel Supply ..... WP 0005-25

Figure 25. Tie Back Doorways ..... WP 0005-31

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Operation Under Usual Conditions – Continued ..... WP 0005

Figure 26. Grip Shelter by Hubs ..... WP 0005-32

Figure 27. Secure First Cinch Strap ..... WP 0005-34

Figure 28. Roll Up Shelter with Floor ..... WP 0005-34

Figure 29. Ready for Assisted Lift of Shelter ..... WP 0005-35

Figure 30. Lift Transport Bag ..... WP 0005-35

Figure 31. Push Transport Bag onto Trailer ..... WP 0005-36

Figure 32. Trailer Leveled and Secured ..... WP 0005-37

Figure 33. Attach Trailer to Tow Vehicle ..... WP 0005-38

Figure 34. Secure Tongue Jack Assembly ..... WP 0005-40

Figure 35. Trailer Safety Brake Lockout ..... WP 0005-41

Figure 36. Trailer Properly Chocked and Positioned on Transport Trailer Deck ..... WP 0005-44

Table 1. Weight of TMSS-MED Trailer ..... WP 0005-45

Figure 37. CG Tag Location on TMSS-MED Trailer ..... WP 0005-45

Figure 38. CG of TMSS-MED Trailer ..... WP 0005-46

Operation Under Unusual Conditions ..... WP 0006

Emergency Shutdown Procedures ..... WP 0007

Stowage and Decal/Data Plate Guide ..... WP 0008

Figure 1. Location of Identification and Data Plates on Trailer Rear ..... WP 0008-1

Table 1. Identification and Data Plates on Trailer Rear ..... WP 0008-1

Figure 2. Location of Identification and Data Plates on Trailer Curbside ..... WP 0008-2

Table 2. Identification and Data Plates on Trailer Curbside ..... WP 0008-2

Figure 3. Location of Identification and Data Plates on Trailer Front ..... WP 0008-3

Table 3. Identification and Data Plates on Trailer Front ..... WP 0008-3

Figure 4. Location of Identification and Data Plates on Trailer Roadside ..... WP 0008-4

Table 4. Identification and Data Plates on Trailer Roadside ..... WP 0008-4

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Stowage and Decal/Data Plate Guide – Continued....WP 0008

Figure 5. Location of Identification and Data Plates on ECU Front....WP 0008-5

Table 5. Identification and Data Plates on ECU Front....WP 0008-5

Figure 6. Location of Identification and Data Plates on ECU Curbside and Rear....WP 0008-6

Table 6. Identification and Data Plates on ECU Curbside and Rear....WP 0008-6

Figure 7. Location of Identification and Data Plates on Genset Front....WP 0008-7

Table 7. Identification and Data Plates on Genset Front....WP 0008-7

Figure 8. Location of Identification and Data Plates on Genset Curbside....WP 0008-8

Table 8. Identification and Data Plates on Genset Curbside....WP 0008-8

Figure 9. Location of Identification and Data Plates on Genset Rear....WP 0008-9

Table 9. Identification and Data Plates on Genset Rear....WP 0008-9

Figure 10. Location of Identification and Data Plates on Genset Control Panel and Circuit Breaker Panel....WP 0008-10

Table 10. Identification and Data Plates on Genset Control Panel and Circuit Breaker Panel....WP 0008-10

Figure 11. Location of Identification and Data Plates on Genset Control Panel Access Door....WP 0008-11

Table 11. Identification and Data Plates on Genset Control Panel Access Door....WP 0008-12

On-Vehicle Equipment Loading Plan....WP 0009

Figure 1. TMSS-MED Shelter Loading Plan....WP 0009-1

Table 1. TMSS-MED Shelter Loading Plan....WP 0009-1

Figure 2. TMSS-MED Trailer Loading Plan....WP 0009-2

Table 2. TMSS-MED Trailer Loading Plan....WP 0009-3

Chapter 3 – Crew Troubleshooting Procedures

Crew Troubleshooting Index....WP 0010

Table 1. Crew Troubleshooting Index....WP 0010-1

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Genset (Engine) Troubleshooting Procedures ..... WP 0011
Table 1. Crew Troubleshooting – Genset (Engine) ..... WP 0011-2
Table 2. Engine Heater (Hydronic) Fault Codes ..... WP 0011-7
Genset (Electrical) Troubleshooting Procedures ..... WP 0012
Table 1. Crew Troubleshooting – Genset (Electrical) ..... WP 0012-2
ECU Troubleshooting Procedures ..... WP 0013
Table 1. Crew Troubleshooting – ECU ..... WP 0013-2
Table 2. ECU Hydronic Heater Fault Codes ..... WP 0013-4
Trailer Troubleshooting Procedures ..... WP 0014
Table 1. Crew Troubleshooting – Trailer ..... WP 0014-2
Shelter (Mechanical) Troubleshooting Procedures ..... WP 0015
Table 1. Crew Troubleshooting – Shelter (Mechanical) ..... WP 0015-2
Shelter (Electrical) Troubleshooting Procedures ..... WP 0016
Table 1. Crew Troubleshooting – Shelter (Mechanical) ..... WP 0016-2

Chapter 4 – Crew Maintenance Instructions

Service Upon Receipt ..... WP 0017
PMCS Introduction ..... WP 0018
PMCS ..... WP 0019
Table 1. Crew Preventive Maintenance Checks and Services ..... WP 0019-1
Table 2. Crew Functional Checks and Services ..... WP 0019-12
Genset – Bulbs and Covers Crew Maintenance ..... WP 0020
Figure 1. Control Panel Indicator and PDP Lights Removal/Replacement ..... WP 0020-4
Crew Maintenance – Fluids ..... WP 0021
Table 1. Engine Oil Recommendations ..... WP 0021-3
Figure 1. Oil Fill Tube and Dip Stick on Engine Location ..... WP 0021-3
Figure 2. Location of Radiator and Radiator Overflow Bottle ..... WP 0021-5
Figure 3. Master Brake Cylinder Service ..... WP 0021-7

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

ECU Control Panel Crew Maintenance ..... WP 0022

Figure 1. ECU Control Panel Lens Indicator and Mode Select Switch Knob Removal/Replacement ..... WP 0022-3

Figure 2. ECU Heater (Hydronic) Coolant Reservoir ..... WP 0022-5

Crew Maintenance – Electrical ..... WP 0023

Table 1. Normal Meter Reading for Battery ..... WP 0023-3

Figure 1. Location of Connectors and Meters for 24 VDC Battery Charging ..... WP 0023-4

Crew Maintenance – Shelter Cover Maintenance ..... WP 0024

Figure 1. Repair of Shelter Cover ..... WP 0024-3

Figure 2. Shelter Cover(s) Removal/Replace ..... WP 0024-6

Crew Maintenance – Shelter Strut Maintenance ..... WP 0025

Figure 1. Repair of Shelter Strut ..... WP 0025-3

Figure 2. Shelter Struts Removal/Replacement ..... WP 0025-6

Crew Maintenance – Shelter Repair Using Field Repair Kit ..... WP 0026

Figure 1. Shelter Keepers Removal/Replacement ..... WP 0026-3

Figure 2. Shelter Main Hub(s) Removal/Replacement ..... WP 0026-5

Figure 3. Main Staking Bracket Removal/Replacement ..... WP 0026-7

Chapter 5 – Maintainer Troubleshooting Procedures

Maintainer Troubleshooting Index ..... WP 0027

Table 1. Maintainer Troubleshooting Index ..... WP 0027-1

Genset (Electrical) Troubleshooting Procedures ..... WP 0028

Table 1. Maintainer Troubleshooting – Genset (Electrical) ..... WP 0028-2

Figure 1. 12V Constant Voltage Test Hookup ..... WP 0028-26

Genset (Engine) Troubleshooting Procedures ..... WP 0029

Table 1. Maintainer Troubleshooting – Genset (Engine) ..... WP 0029-2

Figure 1. Solenoids ..... WP 0029-7

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Genset (Engine) Troubleshooting Procedures – Continued ..... WP 0029
Table 2. Engine Selector Switch (ESS) Function ..... WP 0029-8
Figure 2. Flywheel Location in Speed Sensor Port ..... WP 0029-14
Figure 3. Genset Fault System ..... WP 0029-16
ECU (Electrical)/Hydronic Heater Troubleshooting Procedures ..... WP 0030
Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater ..... WP 0030-2
Table 2. ECU Hydronic Heater Fault Codes ..... WP 0030-19
Figure 1. Circuit Breaker Location for TMSS-MED ECU (Version 1) ..... WP 0030-20
Figure 2. Circuit Breaker Location for TMSS-MED ECU (Version 2) ..... WP 0030-20
Figure 3. Hydronic (Auxiliary) Heater Circuit ..... WP 0030-21
Table 3. Mode Select (Version 1) Switch Test ..... WP 0030-22
Table 4. Mode Select (Version 2) Switch Test ..... WP 0030-22
Table 5. Heater Contactor Measurements ..... WP 0030-26
Table 6. CMSP/EMSP Voltage Inputs ..... WP 0030-28
Table 7. CMSP/EMSP Voltage Outputs ..... WP 0030-28
Table 8. CMSP/EMSP 28 VAC Outputs ..... WP 0030-29
ECU (Heating & Cooling)/Hydronic Heater Troubleshooting Procedures ..... WP 0031
Table 1. Maintainer Troubleshooting – ECU (Heating & Cooling) ..... WP 0031-2
Trailer (Electrical) Troubleshooting Procedures ..... WP 0032
Table 1. Maintainer Troubleshooting – Trailer (Electrical) ..... WP 0032-2
Trailer (Mechanical) Troubleshooting Procedures ..... WP 0033
Table 1. Maintainer Troubleshooting – Trailer (Mechanical) ..... WP 0033-2
Shelter (Electrical) Troubleshooting Procedures ..... WP 0034
Table 1. Maintainer Troubleshooting – Shelter (Electrical). ..... WP 0034-2

Chapter 6 – Maintainer Maintenance Instructions - Genset

Service Upon Receipt ..... WP 0035

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Genset PMCS Introduction ..... WP 0036

PMCS (Genset) ..... WP 0037

Table 1. Maintainer Preventive Maintenance Checks and Services - Genset ..... WP 0037-1

Genset Maintenance Index ..... WP 0038

Genset - Access Panel ..... WP 0039

Figure 1. Side Access Panels Removal/Replacement ..... WP 0039-3

Figure 2. Power Distribution Panel Access Panel Removal/Replacement ..... WP 0039-5

Figure 3. Control Panel Access Panel Removal/Replacement ..... WP 0039-7

Figure 4. Top Access Panel Removal/Replacement ..... WP 0039-9

Figure 5. Genset Access Door Latches Removal/Replacement ..... WP 0039-11

Figure 6. Access Cover Removal/Replacement ..... WP 0039-13

Genset Control Panel Bulbs, Covers And Fuse ..... WP 0040

Figure 1. Control Panel Latch Removal/Replacement ..... WP 0040-3

Figure 2. Fuse Removal/Replacement ..... WP 0040-5

Genset Battery, Battery Fuse, Support Bracket, and Warmer ..... WP 0041

Figure 1. Battery Fuse Removal/Replacement (Version 1) ..... WP 0041-4

Figure 2. Battery Fuse (Version 2 and 3) and Associated Cables Removal/Replacement ..... WP 0041-7

Figure 3. Battery, Retainer, Mounting Bracket Removal/Replacement (Version 1) ..... WP 0041-12

Figure 4. Battery, Retainer, Mounting Bracket Removal/Replacement (Version 2). ..... WP 0041-18

Figure 5. Battery, Retainer, Mounting Bracket Removal/Replacement (Version 3) ..... WP 0041-24

Figure 6. Battery Warmer Removal/Replacement (Version 1) ..... WP 0041-27

Figure 7. Battery Warmer Removal/Replacement (Version 2 and 3) ..... WP 0041-30

Genset Oil and Oil Filter ..... WP 0042

Table 1. Engine Oil Recommendations ..... WP 0042-4

Figure 1. Oil and Filter Removal/Replacement ..... WP 0042-5

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Genset Air Filter ..... WP 0043
Figure 1. Air Intake Filter Removal/Replacement ..... WP 0043-3
Genset Fuel Filter ..... WP 0044
Figure 1. Fuel Filter Removal/Replacement ..... WP 0044-4
Genset Fuel Tank ..... WP 0045
Figure 1. Genset Fuel Tank Drain Location ..... WP 0045-3
Genset Low Oil Pressure Cut-Off Switch ..... WP 0046
Figure 1. Low Oil Pressure Cut-Off Switch Removal/Replacement ..... WP 0046-4
Genset Electric Fuel Pump ..... WP 0047
Figure 1. Electric Fuel Pump Removal/Replacement ..... WP 0047-4
Genset Fuel Injection System ..... WP 0048
Figure 1. Oil Dipstick Mount ..... WP 0048-3
Figure 2. Fuel Injector Removal/Replacement ..... WP 0048-5
Figure 3. Fuel Injector Pump Removal/Replacement ..... WP 0048-9
Figure 4. Fuel Injection System Lines Removal/Replacement ..... WP 0048-15
Genset Glow Plug and Glow Plug Connector ..... WP 0049
Figure 1. Glow Plug/Connector Strip Removal/Replacement ..... WP 0049-5
Genset Oil Pressure Switch ..... WP 0050
Figure 1. Oil Pressure Switch Removal/Replacement ..... WP 0050-4
Genset Oil Pressure Sending Unit ..... WP 0051
Figure 1. Oil Pressure Sending Unit Removal/Replacement ..... WP 0051-4
Genset Solenoid ..... WP 0052
Table 1. Electronic Connections for Genset Solenoids ..... WP 0052-3
Figure 1. K2 or K3 Solenoid Removal/Replacement ..... WP 0052-4
Figure 2. K4 Solenoid and Circuit Breaker Removal/Replacement ..... WP 0052-7

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Genset Starter....WP 0053
Figure 1. Starter Removal/Replacement....WP 0053-4
Genset Diesel Speed Sensor....WP 0054
Figure 1. Diesel Speed Sensor Removal/Replacement....WP 0054-5
Genset Coolant Temperature Sensor....WP 0055
Figure 1. Coolant Temperature Sensor Removal/Replacement....WP 0055-4
Genset Coolant Temperature Switch....WP 0056
Figure 1. Coolant Temperature Switch Removal/Replacement....WP 0056-4
Genset Thermostat....WP 0057
Figure 1. Thermostat Removal/Replacement....WP 0057-5
Genset Engine Coolant....WP 0058
Table 1. Radiator Coolant to Water Ratios....WP 0058-4
Figure 1. Engine Coolant Removal/Replacement....WP 0058-4
Figure 2. Engine Coolant Reservoir Bottle Removal/Replacement....WP 0058-6
Genset Radiator....WP 0059
Figure 1. Radiator, Hoses, and Clamps Removal/Replacement....WP 0059-7
Genset Alternator....WP 0060
Figure 1. Alternator Removal/Replacement....WP 0060-4
Genset Fan Belt....WP 0061
Figure 1. Fan Belt Adjustment, Removal/Replacement....WP 0061-5
Genset Fan....WP 0062
Figure 1. Fan Removal/Replacement....WP 0062-5
Genset Water Pump....WP 0063
Figure 1. Water Pump Removal/Replacement....WP 0063-5

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Genset Engine Heater (Hydronic) ..... WP 0064

Figure 1. Engine Heater (Hydronic) Removal/Replacement ..... WP 0064-5

Figure 2. Engine Heater (Hydronic) Fuel Pump and Fuel Filter Removal/Replacement ..... WP 0064-10

Figure 3. Engine Heater (Hydronic) Hose Removal/Replacement ..... WP 0064-18

Figure 4. Engine Heater (Hydronic) Hose Fuse Removal/Replacement ..... WP 0064-20

Genset Exhaust System ..... WP 0065

Figure 1. Exhaust Flex Pipe, Elbow and Muffler Removal/Replacement ..... WP 0065-7

Genset Exhaust Manifold ..... WP 0066

Figure 1. Exhaust Manifold and Gasket Removal/Replacement ..... WP 0066-4

Torque Specifications ..... WP 0067

Figure 1. Bolt Diameter and Thread Pitch ..... WP 0067-1

Table 1. Component Torque Specifications ..... WP 0067-2

Table 2. Flanged Head Bolt Torque Specifications ..... WP 0067-3

Table 3. Standard Bolt Torque Specifications ..... WP 0067-3

Table 4. Newton-Meters to Kilogram-Meters ..... WP 0067-4

Table 5. Kilogram-Meters to Foot Pounds ..... WP 0067-4

Table 6. Newton-Meters to Foot Pounds ..... WP 0067-5

Genset – Control Panel AC Meters ..... WP 0068

Table 1. Meter Connections ..... WP 0068-3

Figure 1. Meter Removal/Replacement ..... WP 0068-4

Genset Control Panel – Gauges and Meters ..... WP 0069

Table 1. Meter/Gauge Connections ..... WP 0069-5

Figure 1. Meter/Gauge Removal/Replacement ..... WP 0069-6

Table 2. Hour Meter Connections ..... WP 0069-8

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Genset Control Panel – Switches and Potentiometer ..... WP 0070
Figure 1. Potentiometer Removal/Replacement ..... WP 0070-4
Table 1. Genset Control Panel - Rotary Switch Connections ..... WP 0070-7
Figure 2. Rotary Switch Removal/Replacement ..... WP 0070-8
Table 2. Genset Control Panel - Toggle Switch Connections ..... WP 0070-11
Figure 3. Toggle Switch Removal/Replacement ..... WP 0070-12
Genset Control Panel Lights ..... WP 0071
Figure 1. Light Assemblies Removal/Replacement ..... WP 0071-3
Table 1. Indicator Light(s) Connections ..... WP 0071-5
Genset Control Panel – Switches ..... WP 0072
Figure 1. Battery Switch Removal/Replacement ..... WP 0072-4
Genset – Control Panel ..... WP 0073
Figure 1. Control Panel Component Identification ..... WP 0073-4
Table 1. Component Identification ..... WP 0073-4
Genset – Power Distribution Panel Connectors ..... WP 0074
Table 1. Genset Power Distribution Panel – Light Connections (Old Version) ..... WP 0074-3
Figure 1. Power Distribution Panel Lights (Old Version) Removal/Replacement ..... WP 0074-4
Table 2. Genset Power Distribution Panel – Light Connections (New Version) ..... WP 0074-6
Figure 2. Power Distribution Panel Lights (New Version) Removal/Replacement ..... WP 0074-7
Table 3. J1 and J4 Connections ..... WP 0074-10
Figure 3. Connector (J1 and J4) Removal/Replacement ..... WP 0074-11
Table 4. J2 and J3 Connections ..... WP 0074-14
Figure 4. Connector (J2 and J3) Removal/Replacement ..... WP 0074-15
Table 5. J5 Connections ..... WP 0074-18
Figure 5. Connector (J5) Removal/Replacement ..... WP 0074-19
Table 6. J6 Connections ..... WP 0074-21

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Genset – Power Distribution Panel Connectors – Continued. ..... WP 0074
Figure 6. Connector (J6) Removal/Replacement ..... WP 0074-22
Figure 7. Connector Pin Identification ..... WP 0074-23
Genset Barrier Panel – Current Transformer ..... WP 0075
Table 1. Genset Barrier Panel – Current Transformer Connections ..... WP 0075-3
Figure 1. Current Transformer Removal/Replacement ..... WP 0075-4
Genset Barrier Panel – Transducer ..... WP 0076
Table 1. Genset Barrier Panel – Transducer Connections ..... WP 0076-3
Figure 1. Transducer Removal/Replacement ..... WP 0076-4
Genset Barrier Panel – Relays ..... WP 0077
Figure 1. Relay Removal/Replacement ..... WP 0077-3
Genset Barrier Panel – Time Delay ..... WP 0078
Figure 1. Time Delay Removal/Replacement ..... WP 0078-3
Genset Barrier Panel – Voltage Regulator ..... WP 0079
Table 1. Voltage Regulator Connections ..... WP 0079-3
Figure 1. Voltage Regulator Removal/Replacement ..... WP 0079-4
Figure 2. Voltage Regulator Connections and Potentiometer Identification ..... WP 0079-6
Genset Barrier Panel – Speed Sensor ..... WP 0080
Table 1. Speed Sensor Connections ..... WP 0080-3
Figure 1. Speed Sensor Removal/Replacement ..... WP 0080-4
Genset Barrier Panel – Precision Governor ..... WP 0081
Table 1. Precision Governor Connections ..... WP 0081-3
Figure 1. Precision Governor Removal/Replacement ..... WP 0081-4
Figure 2. Potentiometer Location and Identification ..... WP 0081-5
Genset Barrier Panel – Circuit Breaker ..... WP 0082
Table 1. Battery Charger Connections ..... WP 0082-3
Figure 1. Circuit Breaker Removal/Replacement ..... WP 0082-4

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Genset Barrier Panel – Battery Charger ..... WP 0083

Table 1. Battery Charger Connections ..... WP 0083-3

Figure 1. Battery Charger Removal/Replacement ..... WP 0083-4

Genset Fuel Panel ..... WP 0084

Figure 1. Fuel Selector Switch Connections ..... WP 0084-3

Figure 2. Fuel Selector Switch Removal/Replacement ..... WP 0084-4

Figure 3. Auxiliary Fuel Port Removal/Replacement ..... WP 0084-7

Genset Fuel System ..... WP 0085

Figure 1. Genset Fuel Gauge Removal/Replacement ..... WP 0085-4

Figure 2. Genset Fuel Tank Removal/Replacement ..... WP 0085-9

Figure 3. Genset Fuel Line Heater Removal/Replacement ..... WP 0085-14

Genset Removal/Replacement ..... WP 0086

Figure 1. Genset Removal/Replacement ..... WP 0086-6

Figure 2. Preparation for Engine/Generator Removal/Replacement ..... WP 0086-8

Table 1. Generator to Barrier Panel Wiring Connections ..... WP 0086-10

Figure 3. Electrical and Hydronic Heater Connections for Engine/Generator Removal/Replacement ..... WP 0086-11

Figure 4. Oil and Fuel Preparation for Engine/Generator Removal/Replacement ..... WP 0086-13

Figure 5. Radiator and Exhaust Manifold Connections Removal/Replacement ..... WP 0086-15

Figure 6. Engine (hydronic) Heater and Battery Warming Plate Connections Removal/Replacement ..... WP 0086-17

Figure 7. EGA Removal/Replacement ..... WP 0086-19

Table 2. Fuel line Heater Connections ..... WP 0086-22

Table 3. Generator to Barrier Panel Connections ..... WP 0086-24

Figure 8. Separating Engine Generator Assembly ..... WP 0086-28

Chapter 7 – Maintainer Maintenance Instructions - ECU

Service Upon Receipt - ECU ..... WP 0087

PMCS Introduction – ECU ..... WP 0088

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

PMCS (ECU) ..... WP 0089

Table 1. Maintainer Preventive Maintenance Checks and Services – ECU ..... WP 0089-1

ECU Maintenance Index ..... WP 0090

ECU Access Panel ..... WP 0091

Figure 1. ECU Access Panel Latch Removal/Replacement ..... WP 0091-3

ECU Condenser Coil and Grill ..... WP 0092

Figure 1. Condenser Grill Removal/Replacement ..... WP 0092-3

Figure 2. Condenser Coil Cleaning ..... WP 0092-5

ECU Duct Cover, Sliding Door, Evaporator Panel, Damper ..... WP 0093

Figure 1. ECU Duct Cover Removal/Replacement ..... WP 0093-3

Figure 2. ECU Sliding Door Removal/Replacement ..... WP 0093-5

Figure 3. ECU Evaporator Panel Assembly Removal/Replacement ..... WP 0093-7

Figure 4. ECU Damper Assembly Removal/Replacement ..... WP 0093-9

ECU Hydronic Heater ..... WP 0094

Figure 1. Hydronic Heater Removal/Replacement ..... WP 0094-4

Figure 2. Hydronic Heater Fuel Pump and Fuel Filter Removal/Replacement ..... WP 0094-8

Figure 3. Hydronic Heater Hose Removal/Replacement ..... WP 0094-11

Figure 4. Hydronic Heater Fuse Removal/Replacement ..... WP 0094-13

ECU Cut-Off Switches ..... WP 0095

Figure 1. High Temperature Cut-off Switch Removal/Replacement ..... WP 0095-3

Figure 2. High Pressure Cut-Off Switch Removal/Replacement ..... WP 0095-6

Figure 3. Low Pressure Cut-Off Switch Removal/Replacement ..... WP 0095-9

ECU – Evaporator Fan Motor ..... WP 0096

Table 1. Evaporator Motor Electrical Connections ..... WP 0096-3

Figure 1. Evaporator Motor Removal/Replacement ..... WP 0096-4

Figure 2. Evaporator Blower Fan Removal/Replacement ..... WP 0096-7

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

ECU – Condenser Fan Motor ..... WP 0097

Table 1. Condenser Fan Motor Electrical Connections ..... WP 0097-3

Figure 1. Condenser Fan Removal/Replacement ..... WP 0097-4

ECU Evaporator Motor Belt ..... WP 0098

Figure 1. ECU Evaporator Motor Belt Adjustment ..... WP 0098-3

Figure 2. ECU Evaporator Motor Belt Removal/Replacement ..... WP 0098-6

ECU – Compressor and Vibration Dampers ..... WP 0099

Table 1. Compressor Connections ..... WP 0099-4

Figure 1. Compressor Removal/Replacement ..... WP 0099-5

ECU – Valves ..... WP 0100

Figure 1. TEV Removal/Replacement ..... WP 0100-4

Figure 2. Quench Valve Removal/Replacement ..... WP 0100-9

Figure 3. Hot Gas By-Pass Valve Removal/Replacement ..... WP 0100-12

Figure 4. High Pressure Relief Valve Removal/Replacement ..... WP 0100-16

Figure 5. Solenoid Valve Removal/Replacement ..... WP 0100-19

ECU Air Filter ..... WP 0101

Figure 1. ECU Air Filter Locations ..... WP 0101-3

ECU – Filter/Drier ..... WP 0102

Figure 1. Filter/Drier Removal/Replacement ..... WP 0102-4

ECU Control Panel Door ..... WP 0103

Figure 1. ECU Control Panel Faceplate Fluids and components Removal/Replacement ..... WP 0103-7

Figure 2. ECU Thermostat Removal/Replacement ..... WP 0103-10

ECU Control Panel – Circuit Breakers ..... WP 0104

Table 1. Circuit Breaker Connections/Wire ID Numbers ..... WP 0104-3

Figure 1. Circuit Breaker Removal/Replacement (Version 1) ..... WP 0104-4

Figure 2. Circuit Breaker Removal/Replacement (Version 2) ..... WP 0104-5

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

ECU Control Panel – Contactors ..... WP 0105
Figure 1. Contactor Removal/Replacement ..... WP 0105-3
ECU Control Panel – Relays ..... WP 0106
Figure 1. Relay Removal/Replacement ..... WP 0106-3
ECU Control Panel – Transformer and Bridge Rectifier ..... WP 0107
Figure 1. Transformer Removal/Replacement ..... WP 0107-3
Figure 2. Bridge Rectifier Removal/Replacement ..... WP 0107-5
ECU Control Panel – Starter Protectors ..... WP 0108
Figure 1. CMSP/EMSP Removal/Replacement ..... WP 0108-3
ECU Removal/Replacement ..... WP 0109
Figure 1. ECU Removal/Replacement ..... WP 0109-6
ECU – Purging and Brazing ..... WP 0110
ECU – Leak Testing ..... WP 0111
ECU – System Evacuation ..... WP 0112
Figure 1. Evacuation Set-up (Shop Method) ..... WP 0112-3
Figure 2. Evacuation Set-up (Field Method) ..... WP 0112-3
ECU – System Charging and Recovery ..... WP 0112
Figure 1. Refrigerant Recovery Layout ..... WP 0113-3
Figure 2. System Charging (Using Electronic Refrigerant Scale) ..... WP 0113-5
Figure 3. System Charging (Using Standard Scale) ..... WP 0113-6
ECU – Subcool Setting ..... WP 0114
Table 1. R407c Conversion Table ..... WP 0114-4

Chapter 8 – Maintainer Maintenance Instructions – Trailer & Shelter

Service Upon Receipt – Trailer & Shelter ..... WP 0115
PMCS Introduction – Trailer & Shelter ..... WP 0116

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

PMCS (ECU) ..... WP 0117

Table 1. Maintainer Preventive Maintenance Checks and Services – Trailer & Shelter ..... WP 0117-1

Trailer & Shelter Maintenance Index ..... WP 0118

Trailer Level, Safety Chain, and Tongue Jack ..... WP 0119

Figure 1. Trailer Level Removal/Replacement ..... WP 0119-2

Figure 2. Safety Chain Removal/Replacement ..... WP 0119-3

Figure 3. Tongue Jack Assembly Removal/Replacement ..... WP 0119-5

Trailer Lift Sling ..... WP 0120

Figure 1. Lift Sling Removal/Replacement ..... WP 0120-3

Trailer Stabilizer Leg and Cargo Net ..... WP 0121

Figure 1. Stabilizer Leg Removal/Replacement ..... WP 0121-4

Figure 2. Cargo Net Removal/Replacement ..... WP 0121-6

Trailer Basic ..... WP 0122

Figure 1. Reflector Removal/Replacement ..... WP 0122-3

Figure 2. Ground Stud Removal/Replacement ..... WP 0122-5

Figure 3. Lanyard Assembly Removal/Replacement ..... WP 0122-7

Figure 4. Fire Extinguisher Bracket Removal/Replacement ..... WP 0122-9

Trailer Cargo Restraint Cage ..... WP 0123

Figure 1. Cargo Restraint Cage Removal/Replacement ..... WP 0123-4

Trailer Vehicle Stop Light ..... WP 0124

Figure 1. Vehicle Stop Light, Lamp (Incandescent) and Blackout Light Removal/Replacement ..... WP 0124-3

Figure 2. Vehicle Stop Light (Incandescent) Removal/Replacement ..... WP 0124-5

Figure 3. Vehicle Stop Light (LED) Removal/Replacement ..... WP 0124-8

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Trailer Inter-Vehicular Cable ..... WP 0125

Figure 1. Inter-Vehicular Cable Removal/Replacement ..... WP 0125-5

Table 1. Cable Assembly/Stop Light (LED) Connections ..... WP 0125-6

Figure 2. Inter-Vehicular Cable Connectors (Incandescent) ..... WP 0125-6

Table 2. Cable Assembly/Stop Light (Incandescent) Connections ..... WP 0125-6

Trailer Brakes (Wheel Assembly) ..... WP 0126

Figure 1. Brake Hub/Drum Removal/Replacement ..... WP 0126-5

Figure 2. Wheel Cylinder, Brakeshoe, and Backing Plate Removal/Clean and Inspect/Replacement ..... WP 0126-8

Figure 3. Brake Adjustment ..... WP 0126-17

Trailer Brakes ..... WP 0127

Figure 1. Master Cylinder Removal/Replacement ..... WP 0127-3

Figure 2. Brake Line Removal/Replacement ..... WP 0127-7

Figure 3. Bleed Brake System ..... WP 0127-9

Trailer Brakes (Brake Actuator and Hand Brakes) ..... WP 0128

Figure 1. Brake Actuator Mounting Brackets Removal/Replacement ..... WP 0128-4

Figure 2. Tow Pintle and Breakaway Lever Removal/Replacement ..... WP 0128-5

Figure 3. Brake Actuator Shock Absorber and Hydraulic Push Rod Removal/Replacement ..... WP 0128-6

Figure 4. Brake Actuator Assembly (New Version) Removal/Replacement ..... WP 0128-8

Figure 5. Brake Actuator Assembly Removal/Replacement ..... WP 0128-10

Figure 6. Hand Brake Removal/Replacement ..... WP 0128-13

Figure 7. Hand Brake and Sheath Removal/Replacement ..... WP 0128-16

Trailer Tire and Wheel Assembly ..... WP 0129

Figure 1. Wheel Assembly Removal/Replacement ..... WP 0129-5

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Shelter Lighting ..... WP 0130

Figure 1. Fluorescent Lamp in Lighting Fixture Removal/Replacement ..... WP 0130-3

Figure 2. Fuse in Lighting Fixture Removal/Replacement ..... WP 0130-5

Chapter 9 – Parts Information for TMSS-MED

Introduction ..... WP 0131

Table 1. SMR Code Explanation ..... WP 0131-1

GROUP 00 Power Plant, Utility, A1-38283D-001 (PU-821/T), A1-38283D-002 (PU-822A/T) ..... WP 0132

Figure 1. Power Plant, Utility, A1-38283D-001 (PU-821/T), A1-38283D-002 (PU-822A/T) ..... WP 0132-2

GROUP 01 Tent, Modular, General Purpose System, TMSS100G/TMSS100T ..... WP 0133

Figure 2. Tent, Modular, General Purpose System, TMSS100G/TMSS100T ..... WP 0133-1

GROUP 0101 Air Conditioner, T256250G/T256250T ..... WP 0134

Figure 3. Air Conditioner, T256250G/T256250T ..... WP 0134-2

GROUP 010101 Air Conditioner Enclosure, T250250G/T250250T ..... WP 0135

Figure 4. Air Conditioner Enclosure, T250250G/T250250T ..... WP 0135-2

GROUP 01010101 Panel, Evaporator Assembly, TG423-0451-1G/TG423-0451-1T ..... WP 0136

Figure 5. Panel, Evaporator Assembly, TG423-0451-1G/TG423-0451-1T ..... WP 0136-2

GROUP 01010102 Control , Enclosure, Air Conditioner, 088T103 ..... WP 0137

Figure 6. Control , Enclosure, Air Conditioner, 088T103 ..... WP 0137-2

GROUP 01010103 Blower Assembly, 054T102 ..... WP 0138

Figure 7. Blower Assembly, 054T102 ..... WP 0138-1

GROUP 0102 Generator, Diesel Engine, T282271G/T282271T ..... WP 0139

Figure 8. Generator, Diesel Engine, T282271G/T282271T ..... WP 0139-2

GROUP 010201 Battery Assembly, T235064 ..... WP 0140

Figure 9. Battery Assembly, T235064 ..... WP 0140-2

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

GROUP 010202 Engine Assembly, T245264 ..... WP 0141
Figure 10. Engine Assembly, T245264 ..... WP 0141-1
GROUP 01020201 Cooling System Installation, TG440-0001 ..... WP 0142
Figure 11. Cooling System Installation, TG440-0001 ..... WP 0142-2
GROUP 01020202 Air Intake Assembly, X-14210-057-0 ..... WP 0143
Figure 12. Air Intake Assembly, X-14210-057-0 ..... WP 0143-2
GROUP 010203 Radiator Installation, TG421-9000 ..... WP 0144
Figure 13. Radiator Installation, TG421-9000 ..... WP 0144-2
GROUP 010204 Exhaust Assembly, T235005 ..... WP 0145
Figure 14. Exhaust Assembly, T235005 ..... WP 0145-2
GROUP 010205 Control Panel Assembly, T225453 ..... WP 0146
Figure 15. Control Panel Assembly, T225453 ..... WP 0146-1
GROUP 010206 Power Distribution Panel Assembly, TG421-9007 ..... WP 0147
Figure 16. Power Distribution Panel Assembly, TG421-9007 ..... WP 0147-1
GROUP 010207 Barrier Panel Assembly, T225250-5 ..... WP 0148
Figure 17. Barrier Panel Assembly, T225250-5 ..... WP 0148-2
GROUP 0103 Chassis, Trailer Assembly, T215125G/T215125T ..... WP 0149
Figure 18. Chassis, Trailer Assembly, T215125G/T215125T ..... WP 0149-1
GROUP 010301 Stop Light, Vehicular, 12375837-BK-SP ..... WP 0150
Figure 19. Stop Light, Vehicular, 12375837-BK-SP ..... WP 0150-2
GROUP 010302 Tongue Jack Assembly, 190754 ..... WP 0151
Figure 20. Tongue Jack Assembly, 190754 ..... WP 0151-2
GROUP 010303 Brake Installation, T6421-9006G/T6421-9006T ..... WP 0152
Figure 21. Brake Installation, T6421-9006G/T6421-9006T ..... WP 0152-1
GROUP 01030301 Actuator Assembly, TG404-0819G/TG404-0819T ..... WP 0153
Figure 22. Actuator Assembly, TG404-0819G/TG404-0819T ..... WP 0153-2

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

GROUP 0104 Tent, MXA2000G/MXA2020T ..... WP 0154
Figure 23. Tent, MXA2000G/MXA2020T ..... WP 0154-2
GROUP 010401 Tent, End Cap, MXA2020G/MXA2020T ..... WP 0155
Figure 24. Tent, End Cap, MXA2020G/MXA2020T ..... WP 0155-2
GROUP 010402 Tent, Roof and Sides, MXA2035G/MXA2035T ..... WP 0156
Figure 25. Tent, Roof and Sides, MXA2035G/MXA2035T ..... WP 0156-2
GROUP 0106 Light Set, Tent, H300070 ..... WP 0157
Figure 26. Light Set, Tent, H300070 ..... WP 0157-2
GROUP 010601 Wiring Kit, Electrical, T2-95205 ..... WP 0158
Figure 27. Wiring Kit, Electrical, T2-95205 ..... WP 0158-2
National Stock Number Index ..... WP 0159
Part Number Index ..... WP 0160

Chapter 10 – Destruction of Equipment to Prevent Enemy Use for TMSS-MED

General Information ..... WP 0161
Destruction Procedures ..... WP 0162

Chapter 11 – Supporting Information for TMSS-MED

References ..... WP 0163
MAC Introduction ..... WP 0164
Maintenance Allocation Chart (MAC) ..... WP 0165
Table 1. MAC for TMSS Medium ..... WP 0165-1
Table 2. Tools and Test Equipment for TMSS Medium ..... WP 0165-5
Table 3. Remarks for TMSS Medium ..... WP 0165-6
Components of End Item (COEI) and Basic Issue Items (BII) List ..... WP 0166
Table 1. Components of End Item List ..... WP 0166-2
Table 2. Basic Issue Items ..... WP 0166-9

TABLE OF CONTENTS – Continued

Page No.
WP Sequence No.

Additional Authorization List (AAL) ..... WP 0167

Table 1. Additional Authorization List ..... WP 0167-1

Expendable and Durable Items List ..... WP 0168

Table 1. Expendable and Durable Items List ..... WP 0168-1

Table 2. Shelter Repair Kit Items ..... WP 0168-5

Index

DA Form 2028

Authentication Page

Foldout Figures

FO-1. Schematic – ECU (V1) FP-1

FO-2. Schematic – Wiring Diagram – ECU (V1) FP-3

FO-3. Schematic – Schematic – ECU (V2) FP-5

FO-4. Schematic – Wiring Diagram – ECU (V2) FP-7

FO-5. Schematic – ECU Refrigerant FP-9

FO-6. Schematic – Genset Control Panel FP-11

FO-7. Schematic – Genset Power Distribution Panel FP-13

FO-8. Schematic – Genset Barrier Panel Sh 1 of 5 ..... FP-15

Schematic – Genset Barrier Panel Sh 2 of 5 ..... FP-17

Schematic – Genset Barrier Panel Sh 3 of 5 ..... FP-19

Schematic – Genset Barrier Panel Sh 4 of 5 ..... FP-21

Schematic – Genset Barrier Pane Sh 5 of 5 ..... FP-23

FO-9. Schematic – Genset Wiring Harness FP-25

FO-10. Wire List – Genset Sh 1 of 2 ..... FP-27

Wire List – Genset Sh 2 of 2 ..... FP-29

FO-11. Genset Connectors Sh 1 of 2 ..... FP-31

Genset Connectors Sh 2 of 2 ..... FP-33

Foldout Figures – Continued

FO-12. Schematic – Hydronic Heater FP-35

FO-13. Wiring Diagram – Inter-Vehicular cable (LED).....FP-37

FO-14. Schematic – Wiring Diagram – Inter-Vehicular cable (Incandescent) FP-39

FO-15. Schematic –Genset Power Distribution Panel – New Version (with EMI) FP-41

FO-16. Schematic –Genset Power Distribution Panel – New Version (without EMI) FP-43

Back Cover

HOW TO USE THIS MANUAL

PURPOSE AND SCOPE

This technical manual provides Operator and Service level maintenance information for Utility Power Plant PU-821/T and PU-822A/T. To simplify the discussions, the Utility Power Plant PU-821/T and PU-822A/T will be referred to throughout this manual as the Medium Trailer Mounted Support System (TMSS-MED) used in support of the Command Post Platform (CPP). The information includes equipment description and theory of operation, Operator instructions, troubleshooting procedures, maintenance and testing procedures, and supporting data including Repair Parts and Special Tools List for identifying and ordering repair parts.

ARRANGEMENT, IDENTIFICATION AND LOCATION OF FRONT MATTER, REAR MATTER, CHAPTERS, AND WORK PACKAGES

This manual is composed of front matter, chapters containing Work Packages (WPs), and rear matter. These areas are described in greater detail in the following paragraphs.

Front Matter

The front matter includes such items as the Warning Summary, List of Effective Pages/WPs, Table of Contents, and How to Use This Manual.

Chapters and Work Packages

The WPs contain information pertinent to the performance of specific tasks. Each WP is maintained as a separate entity. The WPs are grouped into chapters based on overall content. WPs are arranged in numerical sequence regardless of chapter division. The chapter divisions and the WPs contained within the chapters are listed in the Table of Contents. The contents of each chapter are outlined briefly in the following paragraphs.

Chapter 1 - General Information, Equipment Descriptions, and Theory of Operation. This chapter provides general and descriptive information concerning the equipment. Theory of Operation appropriate to the maintenance level covered is also provided.

Chapter 2 - Operator Instructions. This chapter provides a description and location of the controls, indicators, and connectors on each piece of equipment used in the TMSS-MED. It also contains a description and location of the decals and data plates for each piece of equipment and operation under usual and unusual conditions.

Chapter 3 - Operator Troubleshooting Procedures. This chapter provides operational checkout and troubleshooting procedures appropriate to the maintenance level covered.

Chapter 4 - Operator Maintenance Instructions. This chapter provides information on performing preventive maintenance actions. Included are instructions concerning service upon receipt of equipment, inspection, preventive maintenance checks and services, and repair actions.

Chapter 5 - Service Troubleshooting Procedures. This chapter provides troubleshooting/fault isolation procedures appropriate to the maintenance level covered.

Chapter 6 - Service Maintenance Instructions. This chapter provides information on performing preventive maintenance actions. Included are instructions concerning service upon receipt of equipment, inspection, preventive maintenance checks and services, operational check, and repair actions.

Chapter 7 – Field Support Troubleshooting Procedures. This chapter provides troubleshooting/fault isolation procedures appropriate to the maintenance level covered.

Chapter 8 – Field Maintenance Instructions. This chapter provides information and instructions on performing maintenance repair appropriate to the maintenance level covered.

Chapters and Work Packages – Continued

Chapter 9. – Parts Information. This chapter provides information on the Repair Parts and Special Tools List (RPSTL). This chapter also contains the national stock number list and part number list. The RPSTL is used to support the maintenance actions in Chapters 4, 6 and 8.

Chapter 10 – Destruction of Equipment to Prevent Enemy Use. This chapter provides information on how to damage the TMSS-MED to prevent usage by the enemy.

Chapter 11 - Supporting Information. Included are a list of reference material, the Maintenance Allocation Chart (MAC) which identifies maintenance actions and their maintenance levels, Components of End Item (COEI) list, Basic Issue Items (BII) list, Additional Authorization List (AAL), and Expendable and Durable Items list.

Rear Matter

The rear matter includes an alphabetical index, foldouts, and copies of DA Form 2028 for recommending improvements to the manual.

Identifying Work Packages

Each WP is identified by a four-digit number. These first digits are assigned sequentially. A new WP that is inserted between two WPs shall use a point numbering scheme to create a new number that logically fits between the two existing WP numbers. Point numbers shall start with “1” and continue in numerical sequence as needed. WPs are revised due to equipment configuration differences, support equipment differences, or other similar situations. For example:

WP 0035 might cover installation of a handle on a basic unit.

WP 0035.1 might cover installation of the same handle on a differently configured unit,
or
installation of an alternate handle in place on the original handle, requiring a different procedure,
or
installation of the handle using an alternate technique or different tools,
or
installation of the handle using alternate fasteners.

Locating Work Packages

There are two ways to locate a WP when the number is not known, using the Table of Contents in the manual's front matter and using the Index in the manual's rear matter.

Locating a Work Package in the Table of Contents

First determine the category of the WP subject and then find the appropriate chapter in the Table of Contents. Scan the WP titles in that chapter until the WP subject matter is found. Follow the leader line to find the WP number.

TABLE OF CONTENTS

WP Sequence No.
Page No.

WARNING SUMMARY

HOW TO USE THIS MANUAL

Chapter 1 - General Information, Equipment Description and Theory of Operation
General Information ..... WP 0001

Figure 1. TMSS-MED System Configuration 0001-1

Table 1. Nomenclature Cross-Reference List 0001-3

Table 2. Abbreviations / Acronyms 0001-4

Equipment Data and Description ..... WP 0002

Figure 1. TMSS-MED Configuration 0002-1

Figure 2. TMSS-MED Shelter Components 0002-2

Figure 3. TMSS-MED Trailer Major Components 0002-3

Locating a Work Package in the Index

Look up the subject matter alphabetically in the Index. The index lists the applicable WP number and the page number within the WP on which the subject matter starts.

INDEX

Subject — WP Sequence No. - Page No.

A

Access Panels and Latches (Genset)
Removal/Replacement 0039-2
Repair Parts 0135, 0139

Actuator brake
Removal/Replacement 0128-7
Repair Parts 0153

Additional Authorization List (AAL) 0167
Additional Authorization List 0167-1
Explanation of Columns in the AAL 0167-1

WORK PACKAGE CONTENT AND PRESENTATION

The content and the presentation techniques used in the WPs vary according to the material covered.

Common Features

In all cases, the WP title is placed at the top of the page immediately below the manual and WP number and is set off by horizontal lines as shown below.

TM 11-6115-742-13&P 0002
GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION TMSS-MED EQUIPMENT DESCRIPTION AND DATA

On the second and subsequent pages of the WP, the manual and WP number are repeated.

The page number is placed at the bottom of the page and consists of the WP number and a sequential number denoting the page within the WP as shown below.

0002-1

Paragraphs are not numbered.

Primary paragraphs are denoted by headings set in **BOLD UPPER CASE (CAPITAL)** type.

Secondary and lower-level paragraphs are denoted by headings set in **Bold Title Case**. These paragraphs always relate to and are subordinate to the most recent primary paragraph heading.

Common Features - Continued

Figures and Tables are numbered sequentially within each WP starting with numeral 1. References to Figures, Tables, and Items are in title case (such as Figure 1).

Descriptive Narrative

For WPs consisting primarily of descriptive narrative (e.g., equipment data, theory of operation, etc.), text begins immediately below the WP title and number.

Procedures

The example below is for WPs consisting primarily of procedures such as maintenance tasks, operating instructions, etc. The initial setup section provides information on tools, material/parts, personnel required, and equipment condition. Procedural steps are numbered.

TM 11-6115-742-13&P **0092**

CONDENSER GRILL REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Spray bottle (WP 0168, Item 54)
Sealing compound
(WP 0168, Item 49)

Personnel Required
One

References
WP 0005

Equipment Condition
ECU shut down

WARNING

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure, (WP 0005).
2. Remove and retain eight screws (Figure 2, Item 2) and eight washers (Figure 2, Item 1) that secure ECU condenser grill (Figure 2, Item 3).
3. Remove and retain condenser grill (Figure 2, Item 3).

In most cases, figures relating to the procedural step are also provided. When the figure is indexed (as in maintenance procedures), procedural steps include the figure number and item number inside parentheses.

Supporting Information

The Supporting Information WPs contain instructions detailing the content and presentation techniques used in the WPs.

CHAPTER 1

GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION FOR TMSS-MED

GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION
TMSS-MED
GENERAL INFORMATION

SCOPE

This Operator and Field Maintenance Manual Including Repair Parts and Special Tools List (RPSTL) provides instructions and procedures for setup, operation, teardown, maintenance, and repair of the Utility Power Plant P/U-821/T and PU-822A/T. To simplify the discussions, the Utility Power Plant P/U-821/T and PU-822A/T will be referred to throughout this manual as Trailer Mounted Support System-Medium (TMSS-MED). The two major components of the TMSS-MED system are a soft-walled shelter and a trailer support system. Typical configuration for the TMSS-MED is shown in (Figure 1).

TMSS Shelter

The TMSS-MED shelter is a soft-walled shelter that can be rapidly deployed in the field by a minimum of four people. The shelter does not require any special equipment for either erecting or striking. The TMSS-MED shelter and system components are carried as cargo on the TMSS-MED trailer.

TMSS Trailer

The TMSS-MED trailer consists of one 18 kW, 120/208 Volt, 3-Phase, 60 Hz, diesel powered generator and one 60,000 BTU/hour Environmental Control Unit (ECU) mounted on a trailer chassis. A vehicle capable of pulling 4,200 lbs. is required to tow the TMSS-MED trailer.

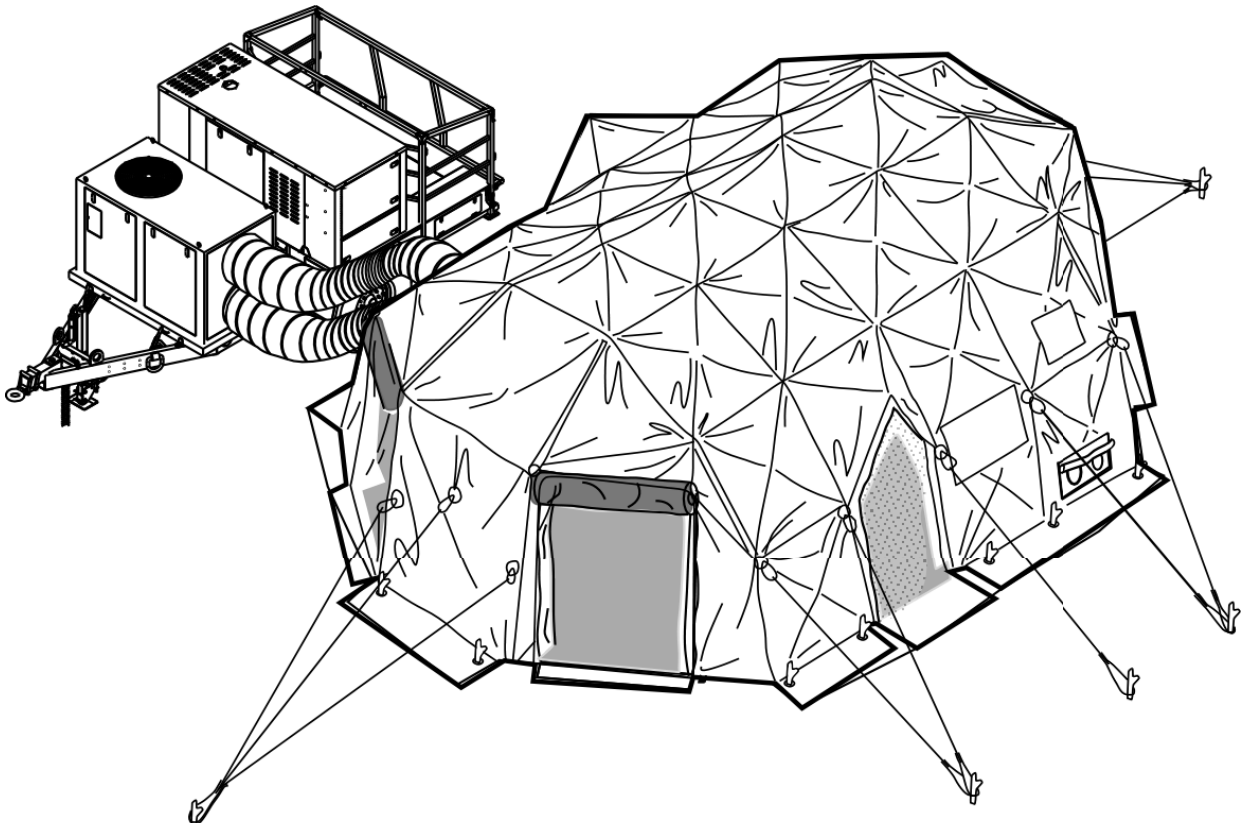


Figure 1. TMSS-MED System Configuration.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by (as applicable) DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual, DA PAM 738-751, Functional Users Manual for the Army Maintenance Management Systems – Aviation (TAMMS-A); or AR 700-138, Army Logistics Readiness and Sustainability.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If the TMSS-MED needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance.

Put it on an SF 368, Product Quality Deficiency Report. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) located in the back of this manual, directly to: Commander, U.S. Army Communications-Electronics Command, 6001 Combat Drive, ATTN: AMSEL-LCL-ECM, Aberdeen Proving Ground, MD 21005-1846. You may also send in your recommended changes via electronic mail or by fax. Our fax number is 443-861-5521, DSN 848-5521. Our e-mail address is MONM-AMSELLEOPUBSCHG@conus.army.mil. Our online web address for entering and submitting DA Form 2028s is http://edm.apg.army.mil/pubs/2028.html.

CORROSION PREVENTION AND CONTROL (CPC)

Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with the TMSS-MED be reported so that the problem can be corrected and improvements can be made to prevent the problem in future TMSS-MED items.

Corrosion specifically occurs with metals. It is an electrochemical process that causes the degradation of metals. It is commonly caused by exposure to moisture, acids, bases, or salts. An example is the rusting of iron. Corrosion damage in metals can be seen, depending on the metal, as tarnishing, pitting, fogging, surface residue, and/or cracking.

Plastics, composites, and rubbers can also degrade. Degradation is caused by thermal (heat), oxidation (oxygen), salvation (solvents), or photolytic (light, typically UV) processes. The most common exposures are excessive heat or light. Damage from these processes will appear as cracking, softening, swelling, and/or breaking.

SF Form 368, Product Quality Deficiency Report, should be submitted to: U.S. Army CECOM Life Cycle Management Command and Fort Monmouth, ATTN: AMSEL-LC-LEO-D-SS, Fort Monmouth, New Jersey 07703-5006.

OZONE DEPLETING SUBSTANCES (ODS)

The use of Class 1 ODS for new acquisitions has been curtailed by Section 326 of the National Defense Authorization Act of Fiscal Year 1993 (Public Law 102, 484) and related Army Policy.

DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE

Procedures to destroy this equipment to prevent enemy use are located in (Chapter 10, WP 0161 and WP 0162) of this manual. Additional information can be found in TM 750-244-2, Procedures for Destruction of Electronic Material to Prevent Enemy Use.

PREPARATION FOR STORAGE OR SHIPMENT

Place items in administrative storage for short periods of time when a shortage of maintenance resources exists. It should be possible to place items in a state of mission readiness either within 24 hours or within the time frame that the directing authority may determine. Keep appropriate maintenance records during storage.

Prior to placing the equipment in administrative storage, Army activities perform Preventive Maintenance Checks and Services (PMCS), complete Equipment Serviceability Criteria (ESC) evaluations, correct shortcomings and deficiencies, and complete all Modification Work Orders (MWO). When removing items from administrative storage, the operator performs PMCS to ensure operational readiness.

Inside storage is preferred for items selected for administrative storage. If inside storage is not available, use trucks, vans, or other containers.

WARRANTY INFORMATION

TMSS-MED system is warranted for one year. Contact the Regional Support Center (RSC) representative for further information on warranted items. Report all defects to supervisor, who will take appropriate action.

NOMENCLATURE CROSS-REFERENCE LIST

Common names and/or abbreviations are used in this manual to make a procedure easier to read. The Nomenclature Cross-Reference List (Table 1) matches the official nomenclatures with the common names.

Table 1. Nomenclature Cross-Reference List.

OFFICIAL NOMENCLATURE	COMMON NAME
Air Conditioner	Environmental Control Unit, ECU
Air Duct Hose	Supply/Return Duct
Antifreeze	Coolant
Cable Assembly, Special Purpose	Inter-Vehicular Cable Assembly
Cinch Belt	Cinch Straps
Engine Generator	Genset
Heavy-High Mobility Multi-Purpose Wheeled Vehicle	H-HMMWV
Heating, Ventilating, and Air Conditioning	HVAC
Power Distribution Unit	PDU
Power Plant, Utility	TMSS-MED
Stake	Rebar/Red Stake
Tent Component Kit	Field Repair Kit
Tent, Roof and Sides	Shelter

LIST OF ABBREVIATIONS/ACRONYMS

The Abbreviation/Acronym List (Table 2) is an alphabetical list of abbreviations/acronyms used throughout this manual.

Table 2. Abbreviation/Acronym List.

ABBREVIATION/ACRONYM	NAME
AC	Alternating Current
AHSS	Aux Heat Selector Switch
BII	Basic Issue Items
BR	Bridge rectifier
BTU	British Thermal Unit
CAGEC	Commercial and Government Entity Code
CB	Circuit Breaker
CC	Condenser Coils
CCR	Contactor, Compressor
CCS	Command Center System
CF	Condenser Fan
CHT	Contactor, Heater
CHT HIGH	Contactor, Heater High
CHT LOW	Contactor, Heater Low
CMP	Compressor
CMSP	Condenser Motor Starter Protector
COEI	Components of End Item
CP	Command Post
CPC	Corrosion Prevention and Control
CPCS	Command Post Communication System
CPP	Command Post Platform
CR	Motor Compressor
D	Depot
DMR	Depot Mobilization Requirements
DS	Direct Support
ECU	Environmental Control Unit
EIR	Equipment Improvement Recommendations
EMSP	Evaporator Motor Starter Protector
ESC	Equipment Serviceability Criteria
FGC	Functional Group Code
F/D	Filter/Dryer
FM	Field Manual
FO	Foldouts
FU	Fuse
GB	Ground Bar
GS	General Support
HCP	Hardness Critical Procedures
HDBK	Handbook
HGBV	Hot Gas Bypass Valve
HM	Hour Meter
HMMWV	High Mobility Multi-Purpose Wheeled Vehicle
HPC	High Pressure Cutout
HPRV	High Pressure Relief Valve
HTC	High Temperature Cutout
HTR1	Heater, Electric 18 KW, 208 VAC
HTR2	Heater, Electric 9 KW, 208 VAC
HVAC	Heating, Ventilating and Air Conditioning
I/O	Input/Output
LED	Light Emitting Diode

Table 2. Abbreviation/Acronym List – Continued.

ABBREVIATION/ACRONYM	NAME
LPC	Low Pressure Cutout
MAC	Maintenance Allocation Chart
MC	Motor, Condenser Fan
ME	Motor, Evaporator Fan
MOS	Military Occupational Specialties
MSS	Mode Select Switch
MWO	Modification Work Order
NBC	Nuclear, Biological, and Chemical
NSN	National Stock Number
ODS	Ozone Depleting Substances
OPL	Out-of-Phase Light
P/N	Part Number
PDB	Power Distribution Block
PDP	Power Distribution Panel
PMCS	Preventive Maintenance Checks and Services
POL	Power On Light
PQDR	Product Quality Deficiency Report
PSI	Pounds per Square Inch
PSR	Phase Sending Relay
QA	Quality Assurance
QV	Quench Valve
RPSTL	Repair Parts and Special Tools List
S1	Switch, Low Pressure
S2	Switch, High Pressure
S3	Switch, High Temp Stage Close
S4	Switch, Low Temp Stage Close
SDR	Supply Discrepancy Report
SG	Sight Glass
SMR	Source, Maintenance and Recoverability
SOP	Standard Operating Procedure
SV	Solenoid Valve
SV1	Solenoid Valve (Liquid)
TAMMS	The Army Maintenance Management System
TB	Troubleshooting
TD	Time Delay, Relay
TDR	Transportation Discrepancy Report
TEV/D	Thermal Expansion Valve and Distributor
TMDE	Test, Measurement, and Diagnostic Equipment
TMSS	Trailer Mounted Support System
TMSS-MED	Trailer Mounted Support System - Medium
TX1	Control Transformer
U/I	Unit of Issue
UPS	Uninterruptible Power Supply
VAC	Voltage, Alternating Current
VI	Vibration Isolators
WD50	Auxiliary Heater
WP	Work Package

QUALITY OF MATERIAL

Material used for replacement, repair, or modification must meet the requirements of this Operator and Field Maintenance Manual. If quality of material requirements is not stated in this Operator and Field Maintenance Manual, the material must meet the requirements of the drawings, standards, specifications, or approved engineering change proposals applicable to the subject equipment.

SAFETY, CARE, AND HANDLING

To prevent personal injury and damage to equipment, obey the following general rules and precautions:

1. Become familiar with the warnings and cautions listed in the front of this manual.

    a. Warnings – Present circumstances or procedures that, if not strictly adhered to, may cause injury or death.

    b. Cautions – Present circumstances that can cause damage to equipment or loss of the mission.

2. Recognize that improperly lifting or carrying heavy equipment can result in serious injury. Follow number of lifter guidelines/requirements in safety marking (labels or stencils) and caution statements in technical documentation.

3. Ensure all power is turned off before starting any removal task. Power should be removed before connecting or disconnecting cables due to shorting hazards.

4. Recognize that equipment (Genset or ECU) may be hot. Allow equipment to cool down before performing any maintenance procedures.

5. Do not touch connector terminals with any tool, bare hands, or dirty cloth. Tools damage the connector. Dirt or sweat causes corrosion.

6. Before touching any electrical components, discharge static electricity by touching a metal chassis or cabinet before handling component. A static discharge to an electrical component can destroy internal circuits.

7. Know where emergency equipment is located. Read instructions on the fire extinguisher label.

8. Ensure hands are clean before working on equipment.

NUCLEAR HARDNESS

All Hardness Critical Procedures (HCP) in this manual are marked with the acronym “HCP” as follows:

1. When the entire task, including all paragraphs and procedures, is considered hardness-critical, only the task title is marked by the acronym “HCP” before the title.

2. When only certain processes and steps within the work package are hardness-critical, only the applicable process and steps are marked by the acronym “HCP” between each applicable step number and the text.

PARTS INFORMATION FOR REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

Repair parts are listed and illustrated in parts information work packages (WP 0131 through WP 0160) of (Chapter 9) in this TM. Maintenance Allocation Chart (MAC) is in (WP 0165).

END OF WORK PACKAGE

GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION
TMSS-MED
EQUIPMENT DESCRIPTION AND DATA

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The TMSS-MED (Figure 1) is comprised of a trailer and soft-walled shelter. The trailer consists of an Environmental Control Unit (ECU), Genset, and cargo bay (transports the shelter and accessories). The ECU provides heating and cooling to the shelter. The Genset is designed primarily to power the ECU and secondarily to power shelter lighting and utility outlets for operating AC electric devices. The shelter can be quickly erected in the field providing an open interior command center, including lighting, heating/cooling, and mobile power generation/distribution in support of many different configurations of Standard Integrated Command Post Systems (SICPS) Platforms.

The TMSS-MED is designed for mobility and can be towed by a vehicle capable of pulling 4,200 lbs. The TMSS-MED is transportable by vehicle, air, rail, or sea and can be loaded by crane and transported by aircraft.

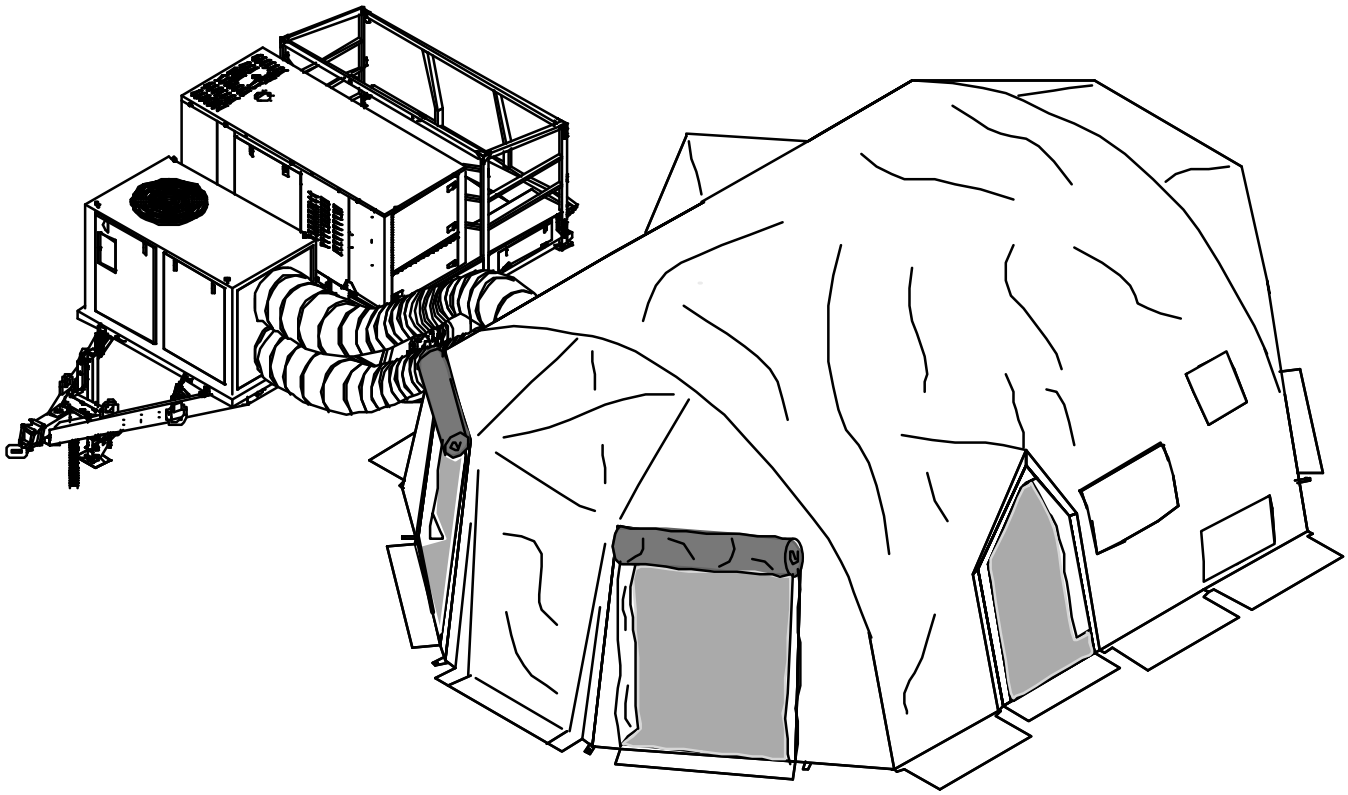


Figure 1. TMSS-MED Configuration.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

TMSS-MED Shelter

The TMSS-MED shelter (Figure 2) is composed of a frame with two pre-attached covers and end-caps. The frame consists of an arrangement of various sized struts connected as pairs and articulated at the hubs. The hubs enable the struts to move freely and allow for quick erect and strike. The interior and exterior cover fabric is fire retardant, mildew resistant, and water repellent. The covers are also abrasion and UV resistant. The exterior fabric enhances blackout in the visual and near infrared spectrum. Covers are pre-attached to the frame at the hubs (via keepers) so that there is approximately one foot of dead air space between the covers and acts as natural insulation. The covers are removable in the event of damage or change of mission. All TMSS-MED shelters feature screen windows, conditioned air supply and return duct ports, wind lines, and ground staking eyes.

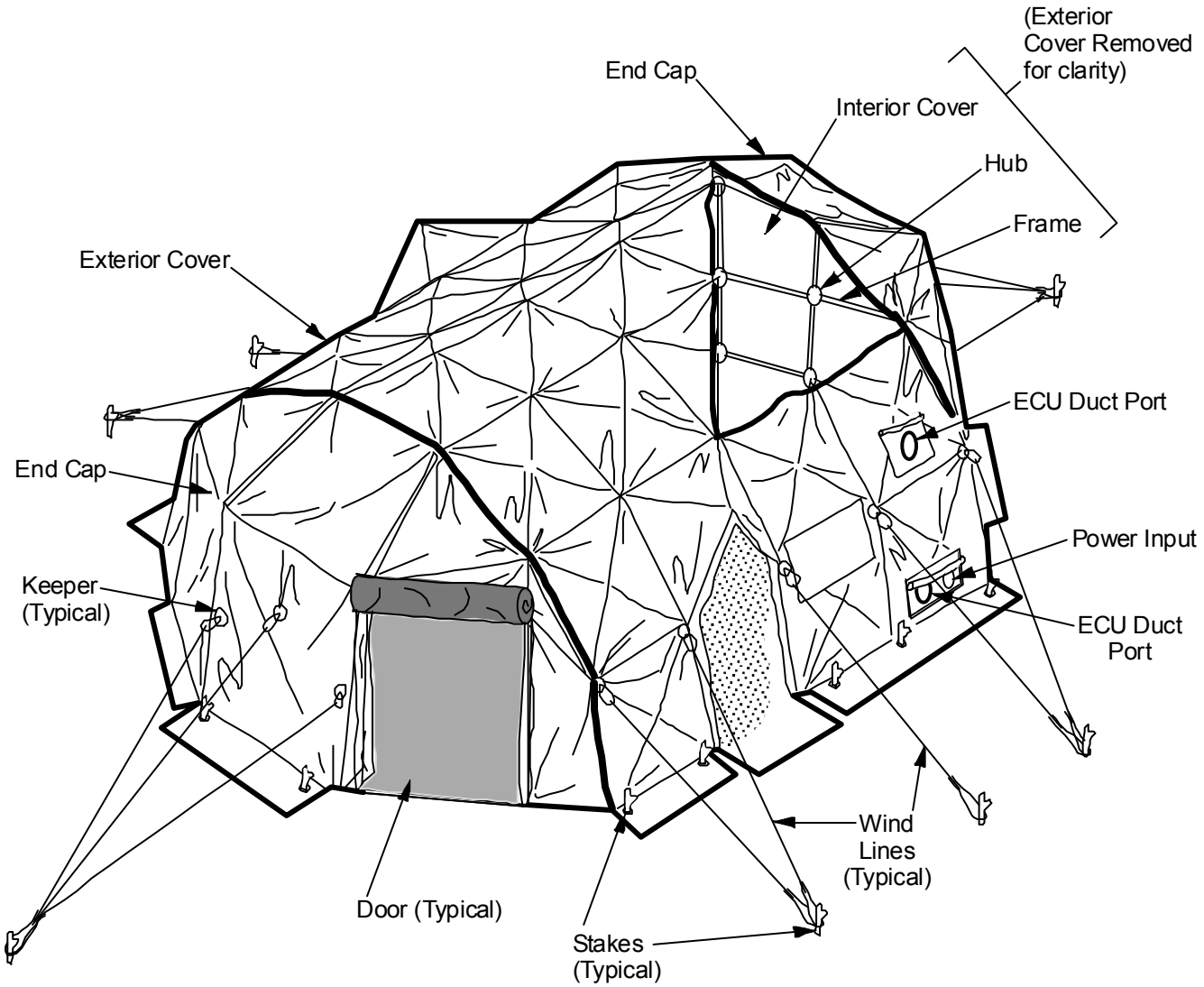


Figure 2. TMSS-MED Shelter Components.

TMSS-MED Trailer

The TMSS-MED trailer (Figure 3) consists of one 18 kW, 120/208 VAC, 3-Phase, 60 Hz, diesel engine Genset and one 60,000 BTU/hour ECU mounted on a trailer chassis. The TMSS-MED Shelter and accessories are added as cargo. A vehicle capable of pulling 4,200 lbs. can tow the trailer. The on-board Genset meets the noise requirements for Tactically Quiet Generators.

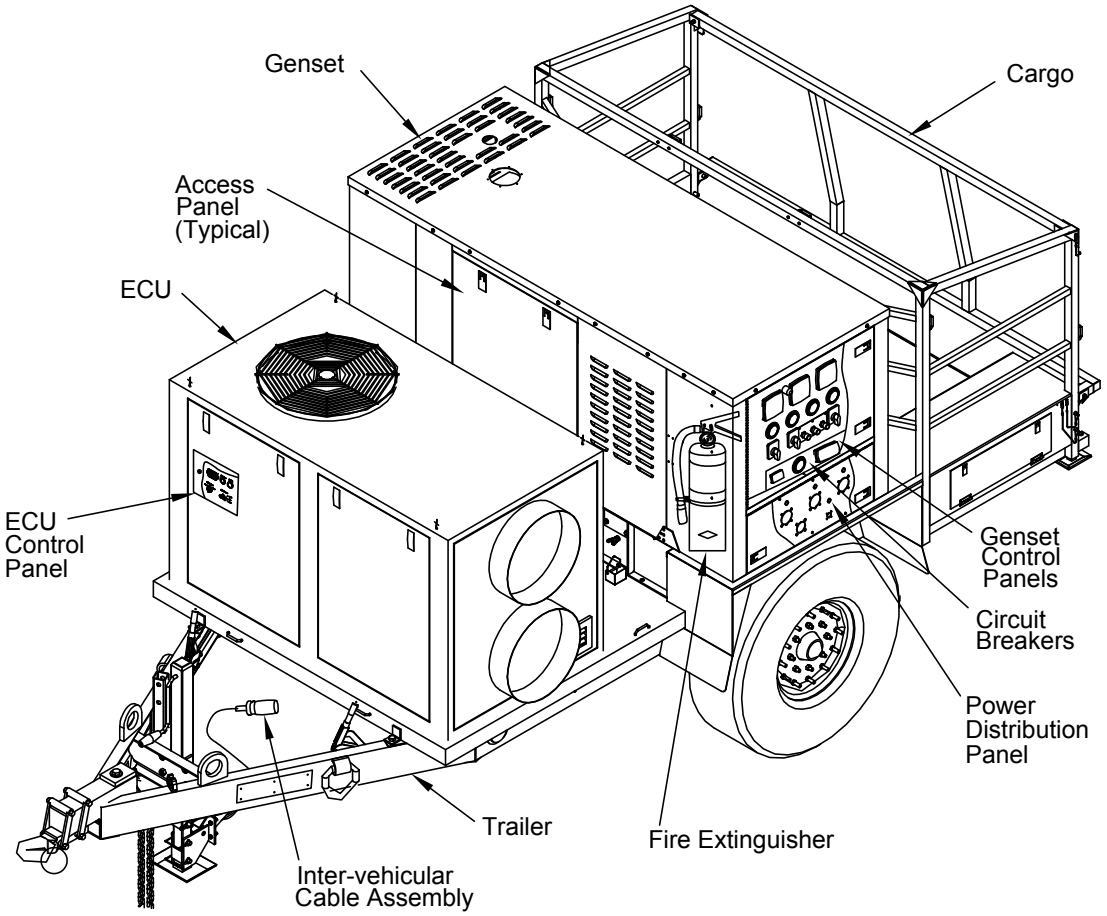


Figure 3. TMSS-MED Trailer Major Components.

TMSS-MED Genset

The 18 kW Genset (Figure 4) consists of a four cylinder, liquid-cooled, 1,800 RPM, diesel engine coupled to a single bearing, four-pole generator. The engine's fuel is supplied from an in-chassis fuel tank. The Genset is intended primarily to provide electric power to the ECU which in turn provides conditioned air (hot or cold) to the shelter. The Genset can provide three main levels of output power:

1. The ECU draws near-maximum electric power from the Genset (approximately 18kW) when operating in high heat mode. In this mode, there is only enough remaining electric power from the Genset for shelter lighting (no BFA computers or peripheral equipment).

2. The ECU draws approximately 9kW of electric power (about one half max power) from the Genset when operating in low heat or Air Conditioning (AC) mode. In either of these modes, there is approximately 9kW electric power available from the Genset for shelter lighting and BFA computers and peripheral equipment.

3. The ECU draws no power from the Genset when it is not operating and the maximum 18kW of electric power is available for secondary use.

NOTE

The Genset should not be operating when there is no electric load on it.

The Genset is housed in a weatherproof, acoustically insulated, aluminum enclosure. The enclosure contains the Genset Control Panel, Power Distribution Panel, Circuit Breaker Panel, and Fuel Control Panel. Two 12 VDC, non-spillable, maintenance-free batteries are use to operate the Genset.

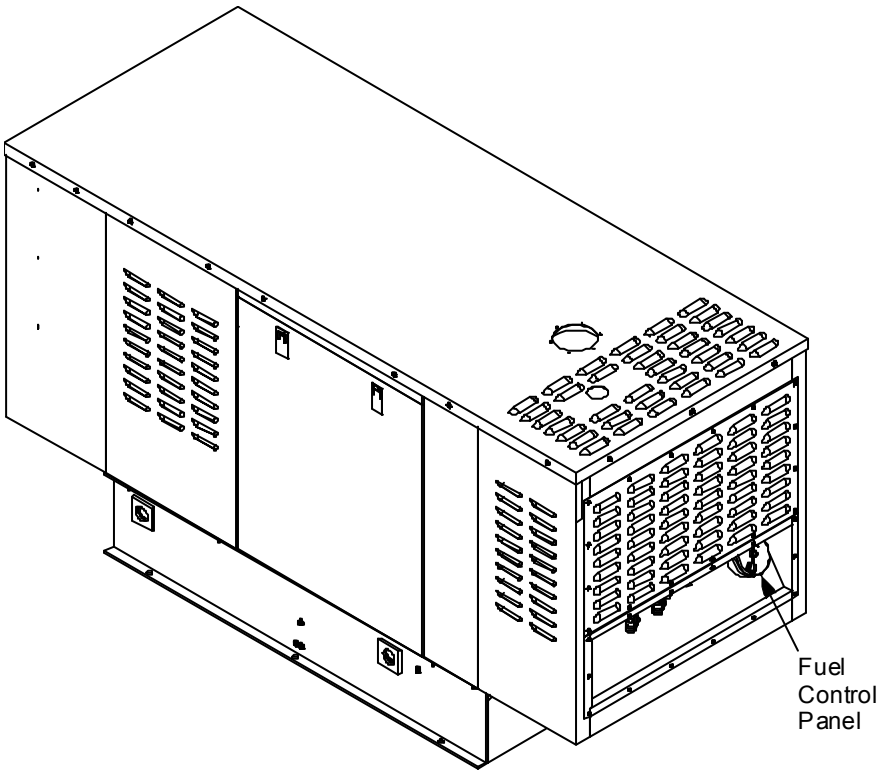


Figure 4. TMSS-MED Genset.

TMSS-MED ECU

The ECU (Figure 5) provides 60,000 BTU/hour (5 tons) of cooling at 131°F (ambient air temperature) or 18 kW of electrical heating. The ECU is designed to provide heating or cooling of the enclosed space created by deployed shelters over an ambient temperature range of -50°F to 131°F. The TMSS-MED ECU has an additional fuel-fired coolant heater that adds up to 17,000 BTU of heat capability for cold weather environments.
There are two different versions of the ECU. All specifications are the same except for the MODE SELECT switch on the ECU Control Panel and the circuit breaker layout behind the control panel (see Figure 1 and Figure 2, WP 0030). On version 1, the MODE SELECT switch has four settings (HEAT, OFF, FAN and COOL) and uses maximum power (18 kW) provided by the Genset and has very little power available for other operations such as laptops or communications equipment. On version 2, the MODE SELECT switch has five settings (HEAT HIGH 18 kW, HEAT LOW 9 kW, OFF, FAN, and COOL). When utilizing the HEAT LOW 9 kW setting, the Genset has 9kW of power available for other operations such as laptops or communications equipment.

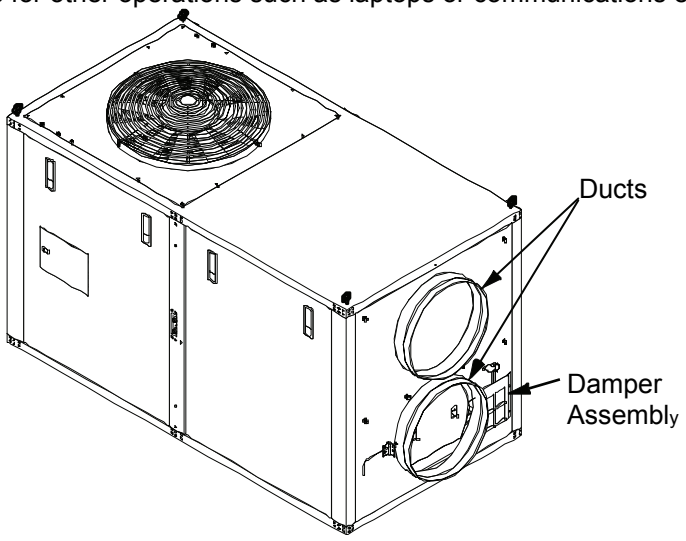


Figure 5. TMSS-MED ECU.

TMSS-MED Cargo Bay

The cargo bay (Figure 6) provides 76 cubic feet of storage space for carrying the TMSS-MED shelter and its accessories. The TMSS-MED shelter and contents are held in place during transit by a webbed cargo net.

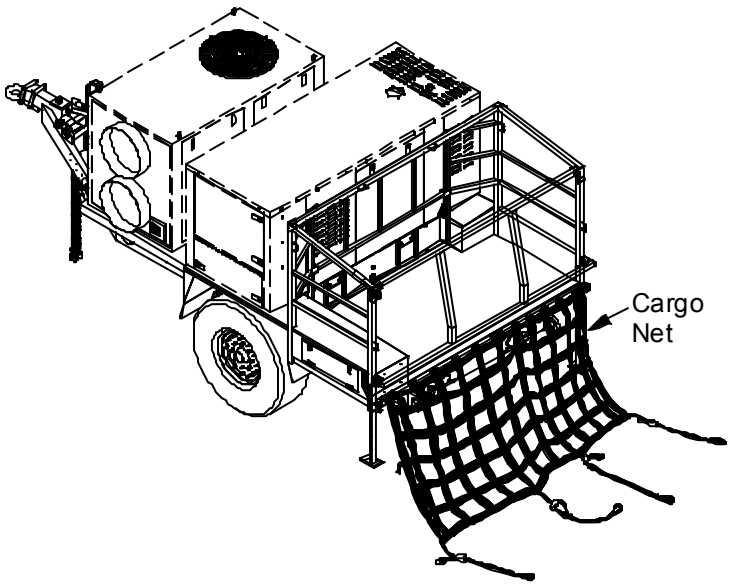


Figure 6. TMSS-MED Cargo Bay.

TMSS-MED Chassis

The TMSS-MED trailer chassis (Figure 7) provides a sturdy mobile platform for the ECU and Genset to be mounted, operated, and transported on. The cargo bay provides ample area for storage and transportation of the shelter, PDU, lighting, and air ducts. There is one storage compartment for tools and auxiliary equipment. An adjustable tongue jack is provided to raise and lower the tow ring (lunette) to pintle height and to level the trailer.

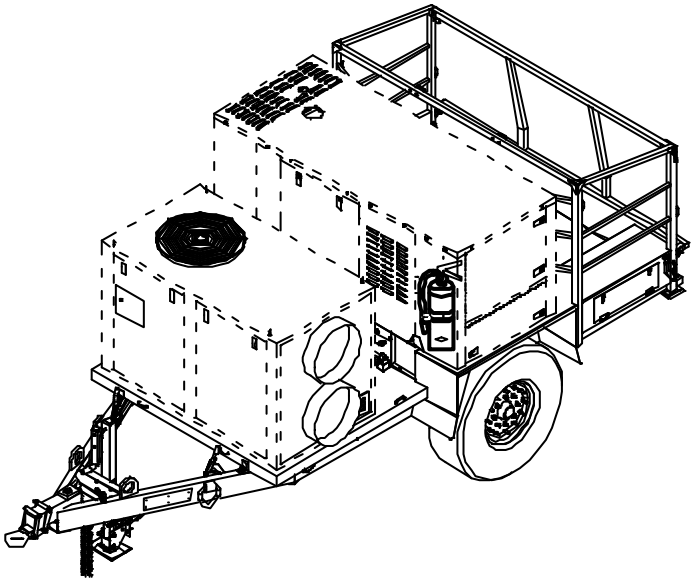


Figure 7. TMSS-MED Chassis.

TMSS-MED Power Distribution Unit (PDU)

The PDU (Figure 8) takes 208 VAC, 3Ø, 60 Hz, from the Genset and provides both 208 VAC, 3Ø, 60 Hz, and 120 VAC output. The outputs are circuit breaker protected and may be monitored by the voltmeter present on the PDU.

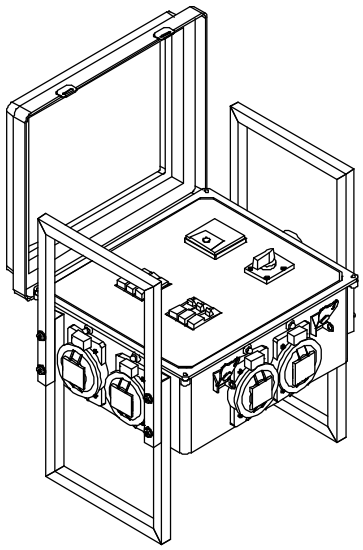


Figure 8. TMSS-MED PDU.

TMSS-MED Tent Lighting Set

TMSS-MED tent lighting set (Figure 9) contains 120 VAC florescent lighting and a wiring kit (not shown). The lighting provides ample task lighting for use in the TMSS-MED. The wiring kit provides the cabling and circuit protection (surge protector) required for interconnectivity of the lighting.

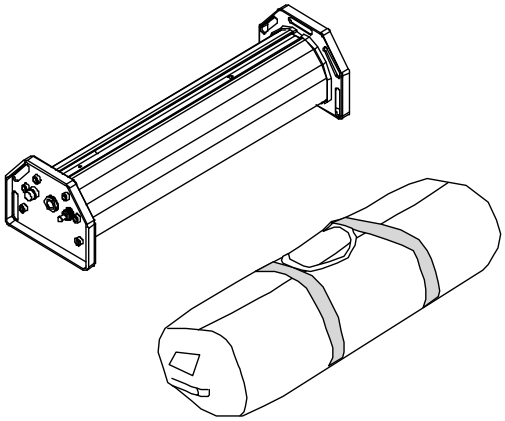


Figure 9. TMSS-MED Tent Lighting Set.

DIFFERENCES BETWEEN MODELS

There are two TMSS-MED systems:

- Power Plant, Utility, PU-821/T, GREEN, NSN 6115-01-547-6713, is a green trailer and green shelter.
- Power Plant, Utility, PU-822A/T, TAN, NSN 6115-01-547-6738, is a tan trailer and tan shelter.

The Model differences have no effect on operation or maintenance functions. The Model/Series information for the TMSS-MED trailer is found on the trailer data plate which is located on the roadside of the trailer on the trailer tongue.

EQUIPMENT DATA

Shelter Specifications

NOTE

Height listed below is for external dimension.

Specifications:

Dimensions (with-out end-caps)	200" L x 228" W x 216" H (5.08 m L x 5.79 m W x 5.48 m H)
Dimensions (with end-caps)	328" L x 228" W x 216" H (8.33 m L x 5.79 m W x 5.48 m H)
Doors/Boots	2 side doors (one per shelter side) 4 door blanks (two per end cap) for booting vehicle to shelter
Insulation Factor	R-3
Foot Print	442 ft^2 (41.06 m^2)
Total Weight	633 lb (287.12 kg)
Packaging	3 cargo bags

Trailer Specifications

Specifications:

Dimensions	191" L x 85" W x 77.5" H (4.85 m L x 2.16 m W x 1.97 m H)
Wheel Track	72" (1.83 m)
Ground Clearance	
Unloaded	18" (0.46 m)
Loaded (Combat Load)	16" (0.41 m)
Tow Ring (Lunette) Nominal Height	28" (0.71 m)
Weights: (Maximum)	
Tare	3,500 lb (1,588 kg)
Gross	4,200 lb (1905 kg)
Tongue (loaded with cargo)	420 lb (190.5 kg)
Cargo Area	41" D x 81" W x 45.5" H (1.04 m D x 2.06 m W x 1.16 m H)
Cargo Area Capacity	76 ft^3 (2.4 m^3)
Noise Level (at 3 feet from the control panel)	
with the ECU Off	68.2 dBA
with the ECU On	75.9 dBA
Electrical System	24 VDC
Brakes	
Primary	Hydraulic surge brake with automatic breakaway actuator
Secondary	Two independent, lever-operated mechanical parking brakes
Axle	Single
Suspension	Torflex suspension rated at 6,000 lbs
Tires	
Size	Two 37 x 12.50 x 16.5 LT
Load Rating	D, bias ply
Type	Goodyear R/T II, run-flat
Inflation	20 psi (highway)/17 psi (off road)
Fuel Tank	16-gallon capacity, baffled
Maximum Speed when Towing Vehicles	55 MPH

Genset Specifications

Specifications:	
Dimensions	84" L x 34" W x 45.5" H (2.13 m L x .86 m W x 1.15 m H)
Weight	1350 lbs. (612.35 kg)
Engine	Four-cylinder, liquid-cooled, direct injection, 1800 RPM, diesel
Ambient Temp	
Minimum	-50ºF (-46ºC)
Maximum	140ºF (+60ºC)
Fuel	
Type	Diesel, JP8
Consumption	1¼ gal/hr @ full load
Battery Capacity	24 VDC
Lubricating Oil	Capacity 8.6 qt. (8.13 liter)
Coolant	Capacity 3.1 gal. (11.73 liter)
Generator	Four-pole, single bearing generator rated for 18 kW at 125ºF providing 120/208 VAC, 60 Hz, 3Ø power
Power Distribution Panel	
120 VAC, 20 A, 1 phase receptacle	2 ea
208 VAC, 60 A, 3 phase	2 ea
120 VAC, 4 A, battery charger receptacle	1 ea
24 VDC NATO/slave receptacle	1 ea

ECU Specifications

Specifications:	
Dimensions	64.9" L x 33.8" W x 38.3" H (1.6 m L x 0.86 m W x 0.97 m H)
Weight	520 lbs. (235.86 kg)
Voltage / Phase / Hertz	208 VAC / 3Ø / 60 Hz
24 VDC NATO/slave receptacle	1 ea
Minimum Power Factor	0.90
Maximum Power Draw	18 kW
Cooling output	60,000 BTU/hr at 125ºF
Heating output	60,000 BTU/hr electric heat 17,000 BTU fuel-fired auxiliary heater
Minimum Cooling Capacity	60,000 BTU/Hr
Ducts	16" (.41 m) dia (supply and return)
Rated Ambient Temperature	125ºF (51.66ºC)
Ambient Temperature (Cooling)	
Maximum	131ºF (55.0ºC)
Minimum	40ºF (4.44ºC)
Ambient Temperature (Heating) Minimum	-50ºF (-45.55ºC)
Air Flow	2400 CFM
Minimum Fresh Air Supply	280 SCFM

PDU Specifications

Specifications:

Dimensions	16" L x 19" W x 19*.5" H (0.41 m L x 0.48 m W x 0.49 m H)
Weight	30 lbs (13.6 kg)
Input Power	120/208 VAC, 3Ø, 60 Hz, 60A
Input Connector	120/208 VAC, 3Ø, 5 wire, 60A, Male
Output Connections	
120/208 VAC, 3 phase 5 wire, 60 A, Female	1 ea
Straight blade flange outlet 120 volt	6 ea
Circuit Breakers	
20 A GFI, single pole	5 ea
30 A GFI, single pole	1 ea
Voltmeter (0-150 VAC)	1 ea

END OF WORK PACKAGE

GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION
TMSS-MED
THEORY OF OPERATION

TMSS MED Shelter

The TMSS-MED shelter consists of a frame with two pre-attached covers. The frame is made up of various sized strut pairs and articulating hubs that enable the struts to move freely for quick erect and strike. Both the interior and exterior covers are made with specially coated polyester fabrics, are fire retardant, mildew resistant, and water repellent. The covers incorporate abrasion resistant and UV resistant fabrics. The exterior fabric finish enhances blackout in the visual and near infrared spectrum. Both covers are pre-attached to the frame at the hub points in such a way that there is approximately one foot of dead air space between the covers serving as natural insulation. These covers are easily removable in the event of damage or change of mission.
The floor is made from a heavy-duty polyester material which provides a barrier against insects and vermin, abrasions, and ground moisture. All TMSS-MED shelters feature screen windows, conditioned air (fresh, hot, and cold) supply and return duct ports, wind lines, and ground stake eyes.

TMSS MED Generator Set

The 18 kW Generator Set consists of a four cylinder, liquid-cooled, 1800 RPM, Diesel engine coupled to a single bearing, four-pole generator. The engine's fuel is supplied from the in-chassis fuel tank. The Genset is housed in a weatherproof, acoustically insulated, aluminum enclosure. The enclosure also contains the Genset Control Panel, Power Distribution Panel, and two 12 VDC, non-spillable, maintenance-free batteries suitable for 24 VDC engine starting. The Genset is intended primarily to power the ECU and secondarily to power shelter lighting and utility outlets for operating AC electric devices.

TMSS MED ECU

The ECU, which operates off of 208 VAC, 3 Ø, 60 Hz, provides 60,000 BTU/hour (5 tons) of cooled air or 60,000 BTU/hr of hot air to the TMSS-MED Shelter. The ECU has an auxiliary fuel-fired heater that provides an additional 17,000 BTU/hr hot air output for cold weather climates. Heat output can be regulated manually or by auto returned air flow and temperature. A selector switch determines the mode of operation. Airflow is directed to and returned from the shelter by way of insulated air ducts. The ECU is housed in a weatherproof, aluminum enclosure that may be removed from the trailer and operated independent of the TMSS-MED trailer (requires an external power source).

TMSS MED Trailer

The SICPS/TMSS Med trailer chassis consists of a six-inch structural steel frame with four tie-down rings and an aluminum upper structure. The TMSS chassis is equipped with a hydraulic surge brake system, two hand-operated parking brakes, two HMMWV standard tires, and a 16-gallon, in-chassis baffled fuel tank, fitted with a four-inch diameter filler and a fuel level indicator. Two 24 VDC tail light assemblies are wired to a 12-pin plug for connecting to the towing vehicle receptacle. An adjustable tongue jack is provided to raise and lower the tow ring (lunette) to pintle height and to level the trailer. A storage post for attaching the dolly wheel/skid plate assembly during towing is provided adjacent to the jack. There is one storage compartment for tools and auxiliary equipment.

GENSET

NOTE

Refer to (Figures FO-6 to FO-11) for schematics of the Genset and its associated electronic components.

Fault System

The fault system (Figure 1) protects the generator set against potential faults described below and provides an indication of any incurred fault. The following summary of the fault system will assist in understanding the operation of the generator set. Additional details relating to specific protection devices are provided in the descriptions of the respective systems. The fault system consists of the following:

- Three malfunction indicators
- High temperature switch and relay (K4)
- Over speed switch and relay (K5)
- Low oil pressure switch and relay (K6)
- Governor control relay (K7) with time delay circuit
- BATTLE SHORT switch

Activation of the over temperature switch, over speed switch, or low oil pressure switch will cause it's respective relay to energize. Each relay has a normally closed and normally open contact. The normally closed contact of the relay opens disconnecting the 24 VDC supply to the governor controller and the fuel pump resulting in generator shutdown. The normally open contact closes illuminating the relay's fault indicator lamp which is located on the control panel.

High Temperature switch (HTS) - activates when the engine coolant leaving the engine exceeds 220 °F.

Over Speed Switch (SS) – activates when the engine speed exceeds 1900 rpm (approximately 64 Hz).

Low Oil Pressure Switch (LOPS) – activates when engine oil pressure drops below 20 psi.

The governor bypass relay (K7) has a four second Time Delay Relay (TDR) in its circuit. The time delay causes the (K7) relay to bypass the high temperature relay (K4) and low oil pressure relay (K6) until the engine starts. The (K7) relay also disconnects the alternator trigger until the four second delay completes.

To reset an activated fault indicator lamp the ENGINE selector switch needs to be set to OFF then the system can be restarted to verify the malfunction has been corrected.

The BATTLE SHORT Switch can be activated before the generator set is started to bypass the fault protection circuits and provide 24 VDC to the governor control module and fuel pump regardless of the malfunction.

Fault System – Continued

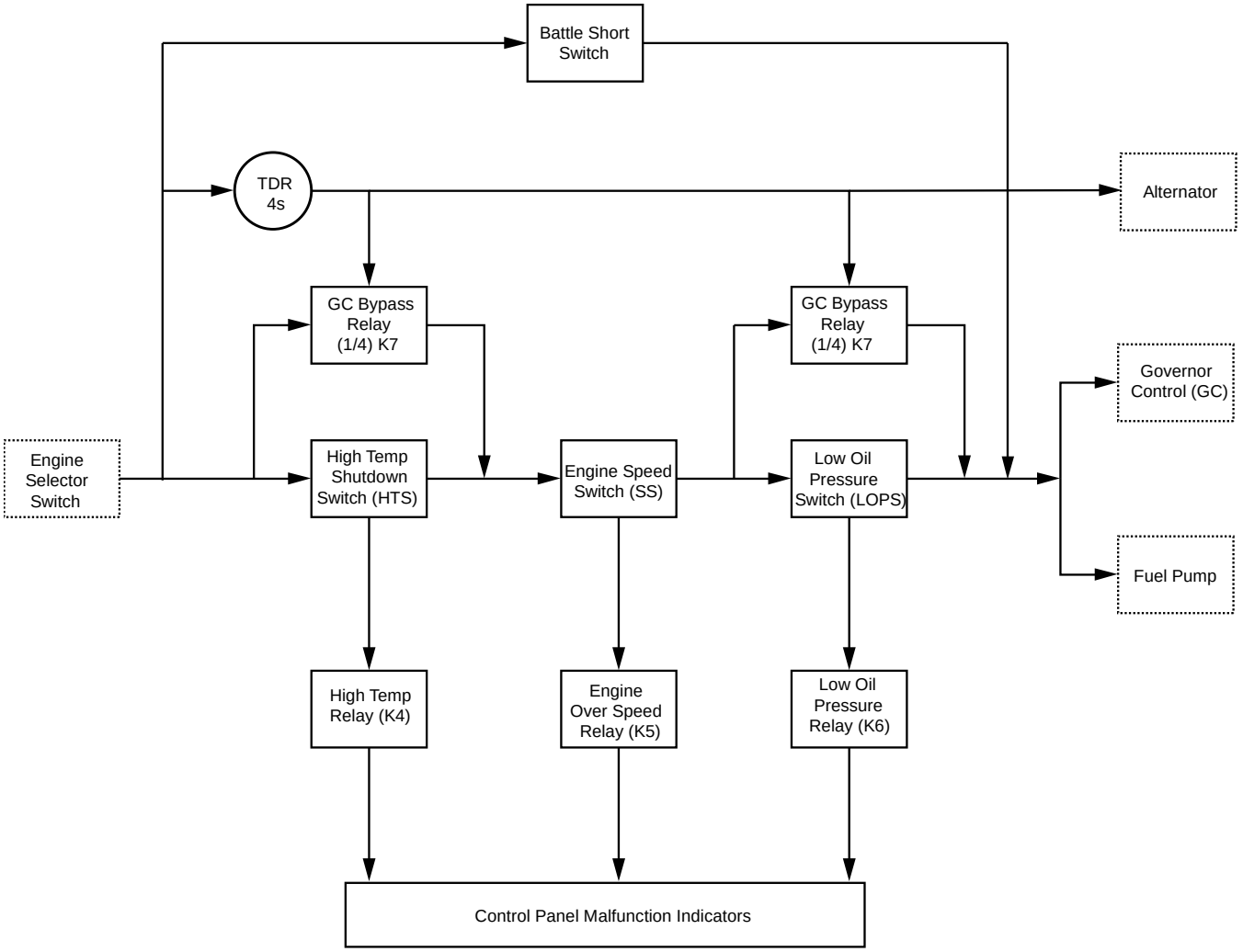


Figure 1. Genset Fault System.

Fuel System

NOTE

Refer to (Figure FO-12) a schematic of the Engine (hydronic) Heater.

The Fuel System is comprised of the engine fuel subsystem which provides fuel to the engine and a heater fuel subsystem for the engines hydronic heater. An auxiliary fuel source, such as a 55 gallon drum of diesel, can be used to supplement the fuel tank. The Fuel System (Figure 2) is comprised of the following components:

- Standard float type fuel gauge
- Fuel tank with source and return lines
- Auxiliary fuel line with return line
- In-line fuel heater
- Engine and hydronic heater fuel filters
- Two fuel pumps
- Four injector pumps
- Four fuel injectors
- Hydronic engine heater

With the ENGINE Selector Switch (SW3) set to START or RUN the fuel transfer pump is powered and draws fuel from the fuel tank. After fuel reaches the injector pumps it is pressurized and forced into the fuel injectors. The fuel is then sprayed by the injectors into the engine combustion chamber where it's mixed with air and ignited. The fuel that is not burned by the engine is returned to the fuel tank by an excess fuel return line. With the engine running, the electrical governor controller adjusts the mechanical governor to maintain a steady metered flow of fuel to the injection pumps. The EMERGENCY STOP button (SW7), located on the generator set circuit breaker panel, can immediately shutdown the engine by causing the mechanical governor to halt fuel flow at the fuel injector pump.

The in-line fuel heater is used for cold temperature operation. The FUEL LINE HEATER Switch (SW8), located on the control panel, when actuated, ensures that the diesel fuel does not jell and clog the fuel filters. The in-line fuel heater is a separate, battery-powered heater that is wrapped around the fuel lines to heat the fuel before it reaches the engine and hydronic heater.

When the ENGINE HEATER Switch (SW6) is actuated, the hydronic heater fuel pump draws fuel from the fuel tank. The fuel is converted to heat, raising the engine coolant above freezing in low temperature environments.

The four switches SW3, SW6, SW7, and SW8 provide the 24 VDC control logic and power needed to operate the engine heater, fuel line heater, fuel pumps, and fuel injector pumps.

Fuel System – Continued

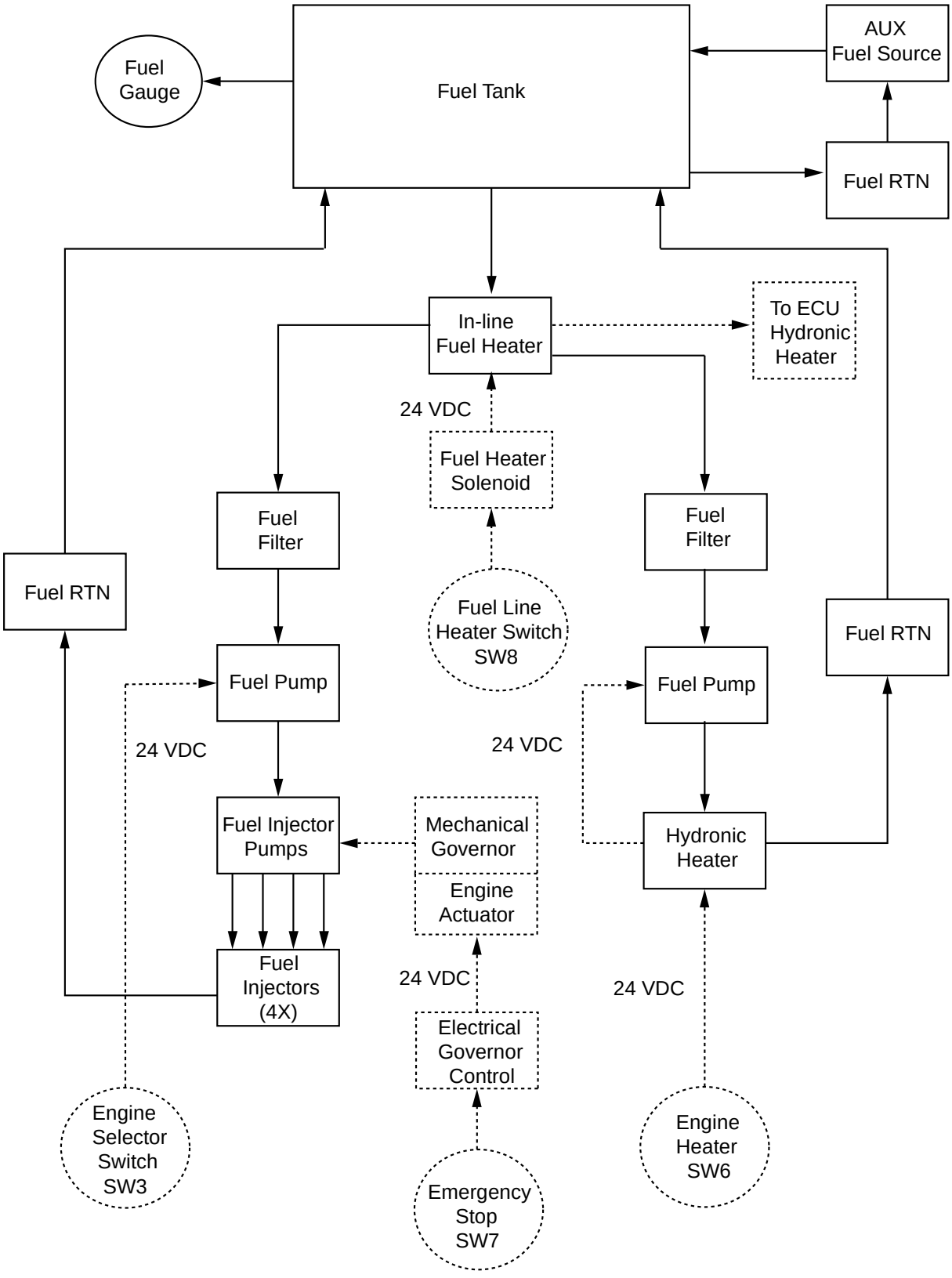


Figure 2. Fuel System.

Engine Heater System

NOTE

Refer to (Figure FO-12) a schematic of the Engine (hydronic) Heater.

The engine heater (Figure 3, Item 1) is a diesel fueled internal combustion heater that heats the cooling system fluid and circulates this fluid through the battery heater tray (Figure 3, Item 2), through the water pump housing (Figure 3, Item 3) and into the engine block (Figure 3, Item 4). The heated fluid exits at the rear of the engine block (Figure 3, Item 4) into a mechanically operated thermostat shutoff housing (Figure 3, Item 5) before returning to the engine heater (Figure 3, Item 1).

The thermostat shutoff (Figure 3, Item 5) operates in an opposite fashion as the engine coolant temperature thermostat. A common engine coolant thermostat is spring loaded and is in the closed position until the engine reaches a certain temperature at which time the spring opens and allows the coolant to flow from the water pump (Figure 3, Item 3) to the engine block (Figure 3, Item 4). The engine heater thermostat is spring loaded and is normally in the open position so that coolant can flow when the engine is cold. Once the engine coolant temperature rises to a preset temperature, the spring closes and prevents any more fluid from circulating through the engine heater circuit.

The engine block (hydronic) heater has its own built in fault system. A flashing light indicates a fault. Refer to (Table 2 of WP 0011) for indicator fault code.

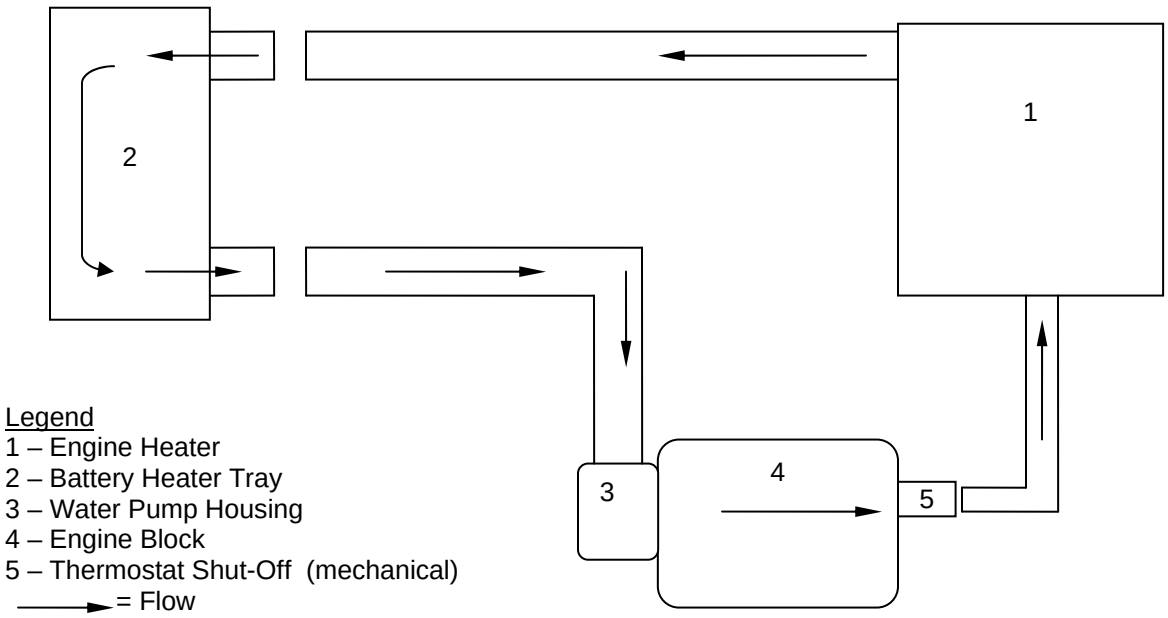


Figure 3. Engine Heater Flow Diagram.

The Fuel Line Heater is a separate, battery-powered heater that is wrapped around the fuel lines to heat the fuel before it reaches the engine.

Engine Cooling System

The Engine Cooling System (Figure 4) consists of the following components:

- Radiator
- Thermostat
- Temperature sender
- Control panel COOLANT TEMP meter
- Water pump
- Belt driven radiator fan
- Cooling jackets (part of engine)
- Coolant high temperature switch
- Cutoff valve

The water pump forces the coolant through passages (cooling jackets) in the engine block and cylinder head where the coolant absorbs heat from the engine. When the engine reaches normal operating temperature, the thermostat opens and the heated coolant flows through the upper radiator hose assembly to the radiator. The cooling fan circulates air through the radiator where the coolant temperature is reduced. A coolant high temperature switch in conjunction with the fault system provides automatic fault shutdown in the event the coolant temperature exceeds 180 +/- 3°F (82 +/- 2°C). The COOLANT TEMP meter indicates the engine coolant temperature, from 100°F to 240°F (38°C to 115°C). When the engine is cold, coolant is also routed through a cutoff valve to the heater. The coolant passes from the heater to the battery mounting plate and back into the engine block. The cutoff valve is set to close when the coolant temperature exceeds 100°F (38°C).

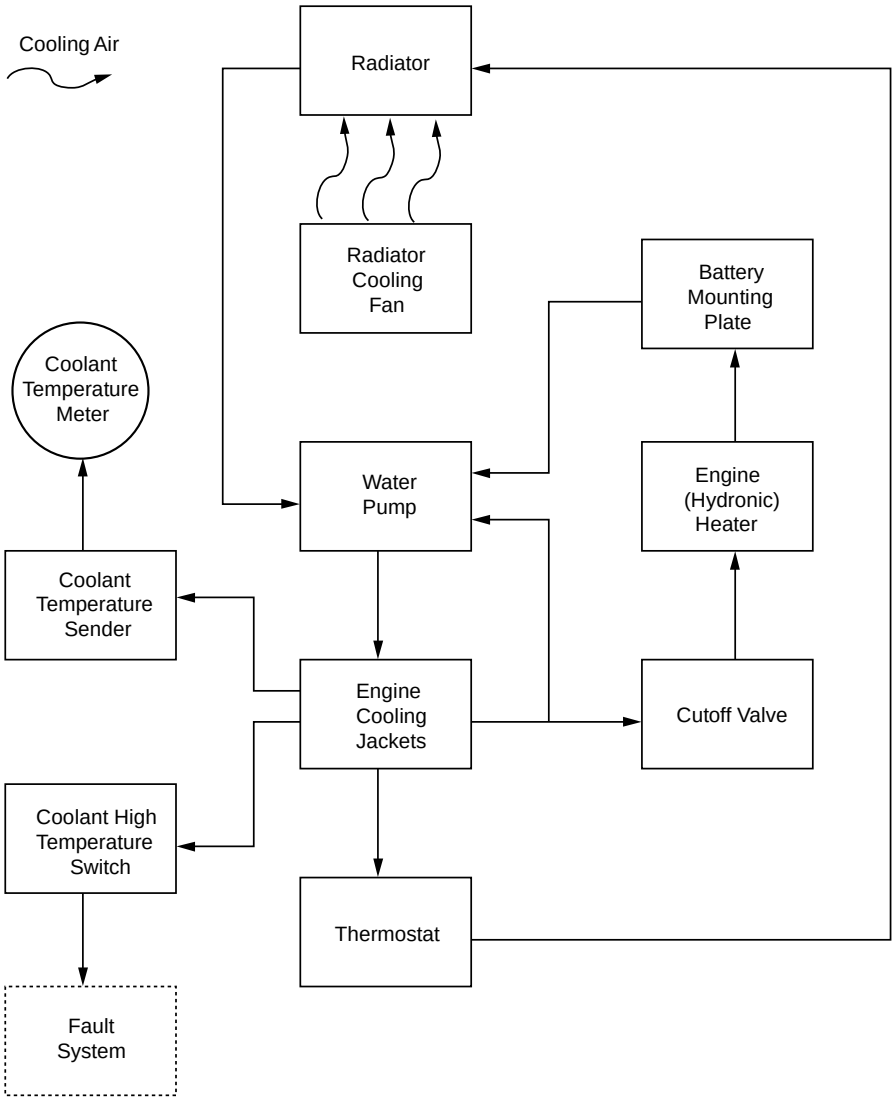


Figure 4. Engine Coolant System.

Engine Lubrication System

The Engine Lubrication System (Figure 5) consists of an oil sump, dipstick, oil pump, pressure relief valve, oil pressure sender, OIL PRESSURE meter, low oil pressure switch, and filter. The oil sump is a reservoir for engine lubricating oil. The dipstick indicates oil level in the sump. The oil level can only be checked when the engine is not running. The pump draws oil from the sump through a strainer removing large impurities. A pressure relief valve monitors oil pressure and shunts oil back into the sump to help relieve pressures in excess of 63.81 psi (440 kPa). The oil then passes through a spin-on type filter where small impurities are removed. From the filter, oil is distributed to the engine's internal moving parts and returns to the oil sump. The oil pressure sender located in the engine crankcase senses oil pressure. The oil pressure is displayed on the OIL PRESSURE Meter. The low oil pressure switch, also located in the engine crankcase, functions with the generator set fault system. The engine is automatically shut off if the oil pressure drops below 20 psi (138 kPa).

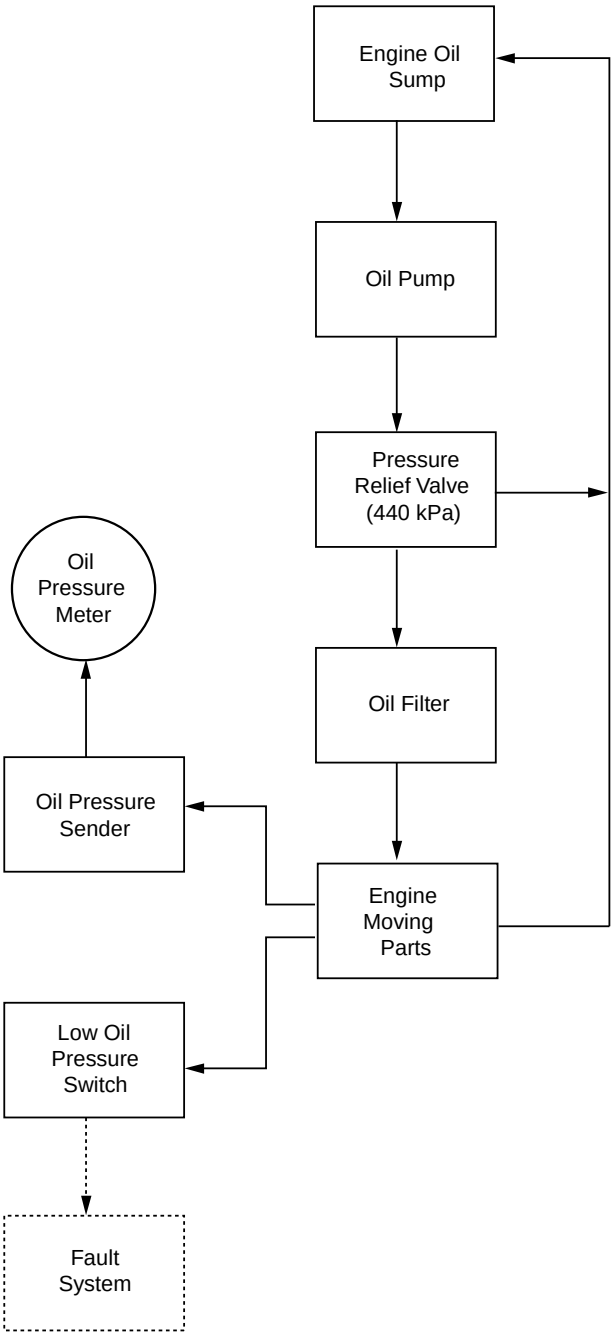


Figure 5. Engine Lubrication System.

Power Generation/Supply System

The Power Generation/Supply System (Figure 6) consists of the following components:

- AC generator
- AC generator junction box
- Generator circuit breaker CB5 GEN
- Fuse bank
- VOLTAGE/AMMETER switch for monitoring individual phases
- Ammeter, voltmeter, frequency meter, and watts meter
- Load distribution terminal blocks
- Load output circuit breakers
- Power distribution connectors

Power (208 VAC, 3Ø, 60 Hz, 60 A) created by the AC generator is routed through a junction box to the main load disconnect circuit breaker CB5 GEN. The switched 3 phase power from CB5 GEN is then routed to voltage blocks L1 (black), L2 (red), and L3 (blue). The generators un-switched neutral and ground lines are routed directly from the junction box to their respective terminal blocks. The terminal blocks act as a load distribution point. Power is then distributed through circuit breakers CB1 J1, CB2 J2, CB3 J3, and CB4 J4 to interface load connectors J1, J2, J3, and J4.

The CB5 GEN circuit breaker enables or interrupts the power to the load terminal blocks. The power is monitored at the load side of the circuit breaker. Power from phase legs L1, L2, and L3 is passed through fuses F1, F2, and F3 to the VOLT/AMP switch SW1. The SW1 switch transfers individual phases for monitoring on control panel meters A-C AMPERES, HERTZ, and A-C VOLTS. Current transformers are used to sense the power flow through the load side of CB5 GEN. The current transformers are used by a watts transducer which computes power usage and displays it on the A-C KILOWATTS meter.

The AC generator voltage output is sensed by the voltage regulator circuit. The voltage regulator maintains the generator output voltage by providing a DC control signal to the field terminals of the exciter. The AC generator frequency is controlled by the governor control system, sensed by the frequency transducer and is read on the HERTZ frequency meter. The circuit breakers in the circuit breaker panel disconnect the load whenever an overload or short circuit exists. The critical operating parameters of the engine are monitored by the fault system which shuts down the engine when a fault occurs and stops power generation.

Power Generation System - Continued

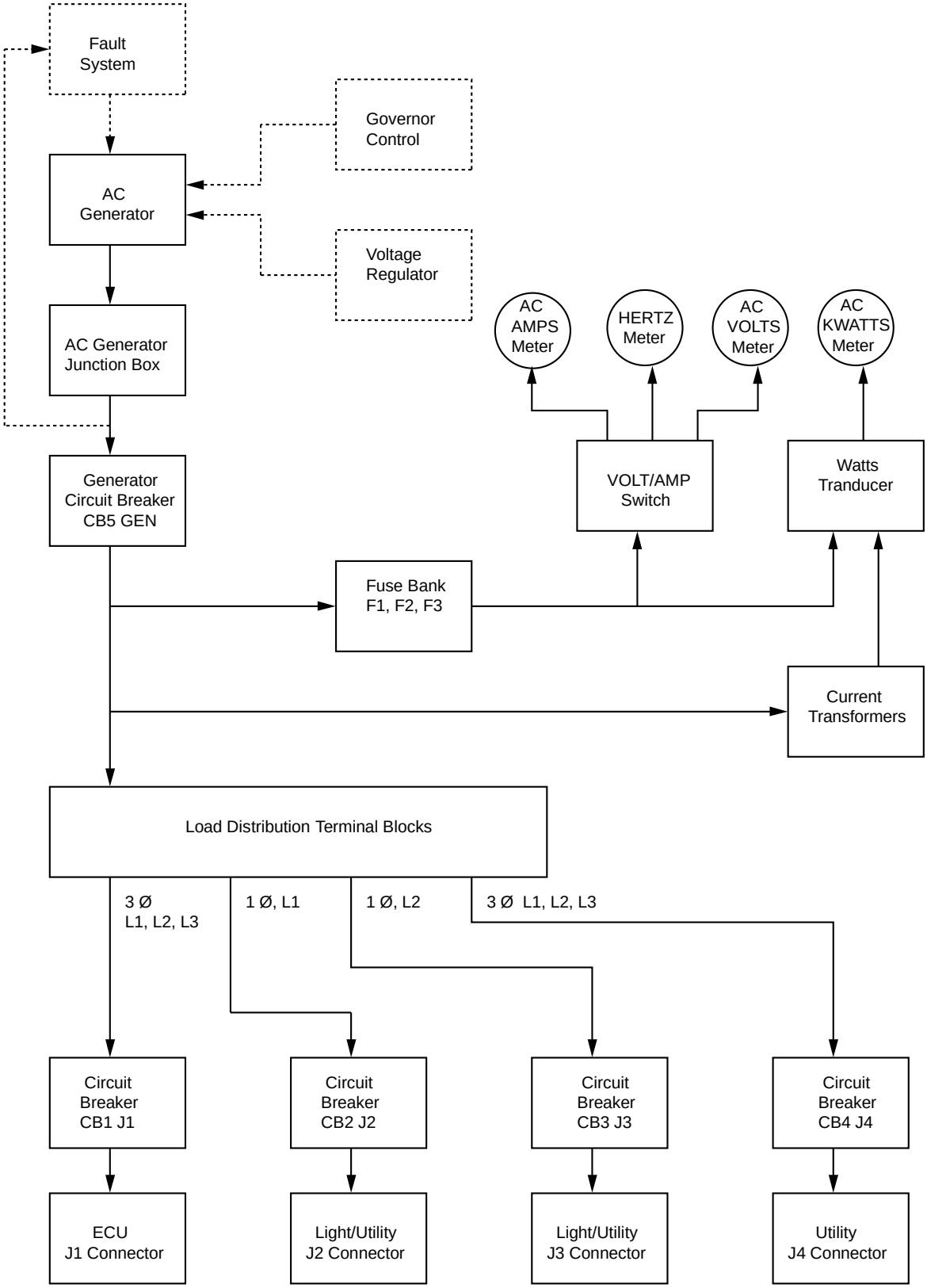


Figure 6. Output Supply System.

Barrier Panel

The barrier panel (Figure 7) is located behind the control panel and power distribution panel on the Genset. It contains the electronic components used to control, regulate, and distribute the power generated by the Genset. The barrier panel components consist of:

- Watt Transducer
- Fuses
- Relays (K4-K7)
- Voltage Regulator
- Speed Sensor
- Precision Governor
- Circuit Breakers (CB1 through CB5)
- Battery Charger
- Current Transformers
- Terminal Blocks

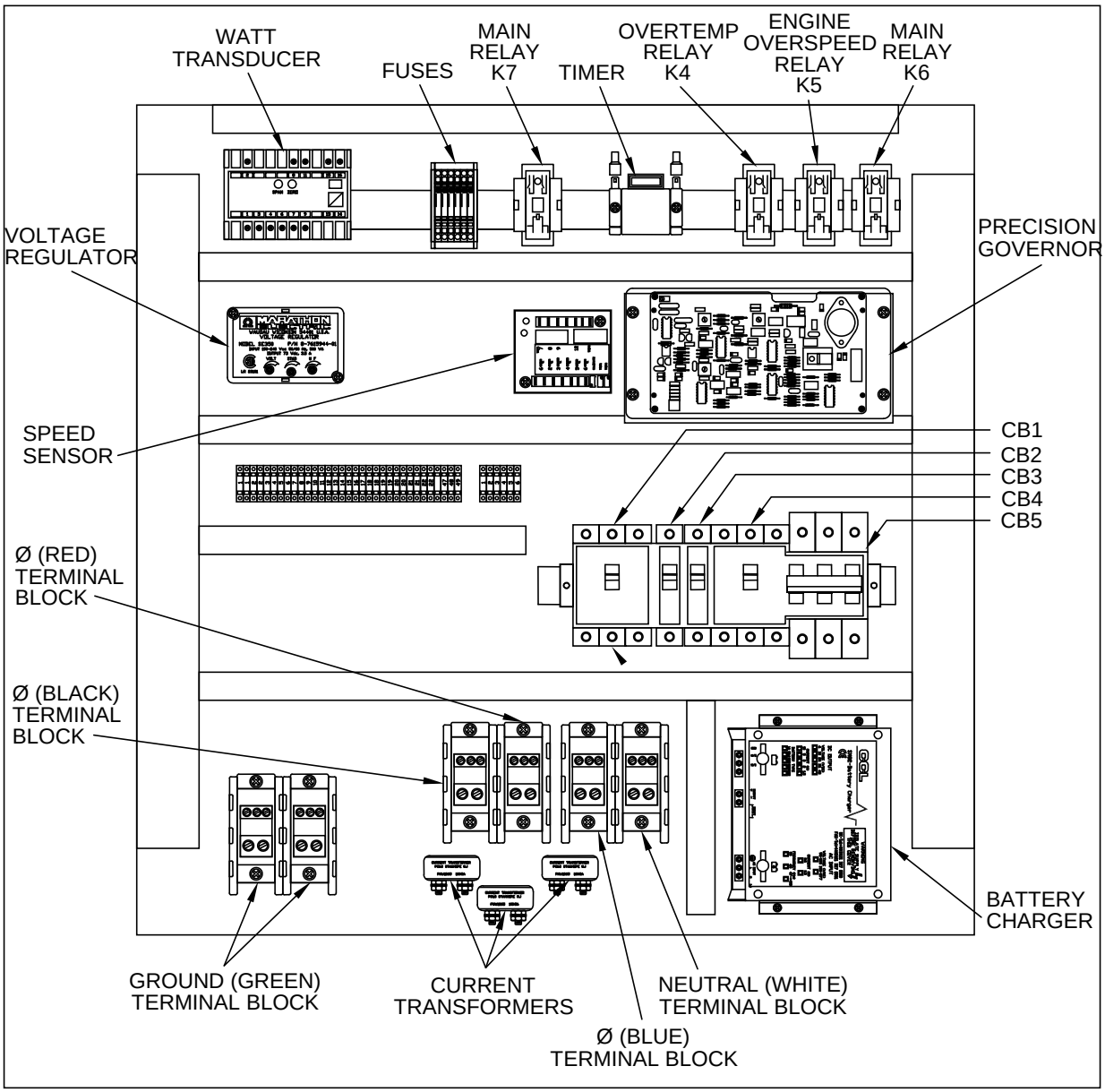


Figure 7. Barrier Panel Component Location.

Governor Control System

The Governor Control System (Figure 8) consists of an electronic precision governor controller, electronic speed switch, a speed sensor, electronic actuator control unit, mechanical governor, and emergency stop switch. The speed sensor is a magnetic pickup coil. It registers the speed of the engine, which is typically 1800 rpm, as the flywheel teeth pass within the field of the pickup coil. The speed sensor signal is monitored by an engine speed switch. The signal is also used by the governor controller in a feedback control loop to regulate engine speed. The governor controller regulates speed with a control signal applied to the actuator control unit. The electro-mechanical actuator adjusts the control linkage to the injection fuel pump system in response to the governor control signal. The EMERGENCY STOP switch, located on the control panel, shuts down the generator by disconnecting the governor control signal to the actuator control unit, eliminating fuel to the injector pumps.

Voltage Regulation System

The voltage regulator senses 208 VAC between phase legs L1 to L3 of the generator. The control panel VOLTAGE ADJUST potentiometer provides a means to adjust the generator field current, which is 70 amps typically, to maintain the desired 208 VAC output voltage for different loads.

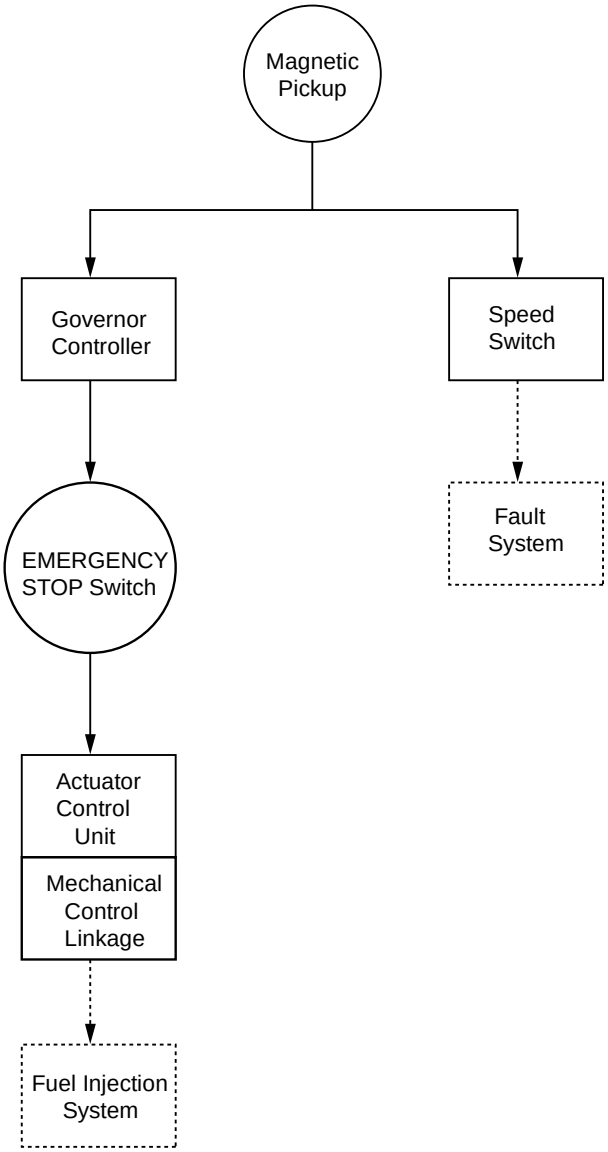


Figure 8. Governor Control System.

Battery Charging System

The battery charging system (Figure 9) consists of the following:

- Circuit breaker CB2 J2
- Indicator lamps J2 and J5
- Fuse F8
- Battery charger
- BATTERY CHARGER AMPS meter
- Two 12 VDC batteries
- External battery charger input connector J5
- NATO/Slave connector J6
- Genset alternator
- Battery Switch

For normal charging conditions the Genset alternator provides a DC charge to the battery. The battery charge is also supplemented by a built-in battery charger when CB2 J2 is actuated. The battery chargers current can be monitored on Genset control panel meter BATTERY CHARGE AMPS. The battery can also be charged through the battery charger with the Genset shut down. An external 120 VAC input can be applied to J5 INPUT connector to provide power, thereby preventing battery freeze-up in cold climates. The battery charge can be monitored at control panel meter BATTERY CHARGE AMPS for this condition. For an emergency situation external power can be applied directly to the battery through the NATO/Slave connector J6. The BATTERY SWITCH should be OFF when connecting or disconnecting the input to J6 and ON when charging the battery.

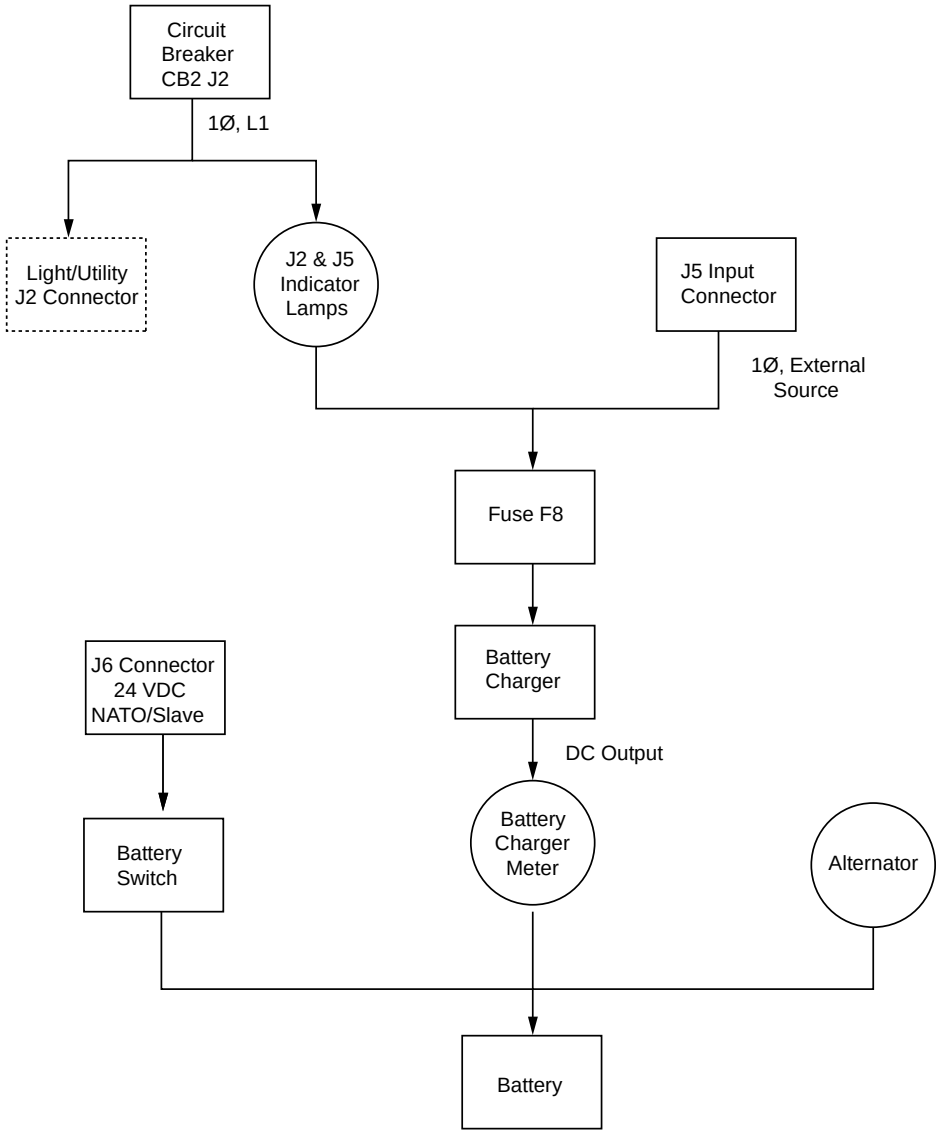


Figure 9. Battery Charging System.

ENVIRONMENTAL CONTROL UNIT

Power Distribution/Fault System

The Power Distribution/Fault System (Figure 10 for Version 1 or Figure 12 for Version 2) distributes power and protects the ECU against potential faults. The following summary of the system and its components will assist in understanding the operation of the ECU in cooling or heating mode. The summary also provides a description of any fault indicators.

The system consists of the following:

- 24 Volt power supply
- Phase sensing relay
- Two motor starter protectors
- Time delay relay
- Heater and compressor contactors
- High temperature cutout
- High and low pressure cutout switches

Refer to (Figure 10 for Version 1 or Figure 12 for Version 2) to locate the system components.

A 24 volt power supply consisting of 208/24 volt step down transformer (TX1) provides a 24 VAC control voltage to the protective relays and fault sensors. The 24 VAC is also converted to 24 VDC by a bridge rectifier (BR) to supply power to the auxiliary heater.

The Phase Sensing Relay (PSR) detects an out of phase condition when incoming power wires are connected in the wrong order. During an out of phase condition, the normally open relay contact remains open removing the 24 VAC control voltage to the contactors and motor starter protectors, disabling the ECU. The normally closed relay remains closed applying 24 VAC to the Out of Phase Indicator (OPL), turning it red.

The Condenser Motor Starter Protector (CMSP) and Evaporator Motor Starter Protector (EMSP) enable the fan motors to draw large turn-on surge current without tripping a circuit breaker. A Time Delay Relay (TDR) turns on the compressor starter 15 seconds before power is applied to the compressor.

The Compressor Contactor (CCR) and Heater Contactor (CHT) apply line voltages to the compressor and heater units. During normal operation the 24 VAC control voltage actuates the contactors. When a fault occurs, large current flows to the motor through the overload heater elements in the contactor. The elements heat up and cause the normally-closed contacts to spring open. This will de-energize the contactor relay and shut off power to the motor. After the contactor heater cools down, it can be reset manually to re-apply power to the motor.

The High Temperature Cutout (HTC) switch is a protective thermostat located in the evaporator enclosure. The HTC acts as a safety to cut off power to the heater coils and blower motor if the temperature in the enclosure exceeds 190 °F. Two causes for excessive temperatures is blockage of airflow through the evaporator enclosure or a fan failure.

The High Pressure Cutout (HPC), located at the discharge side of the compressor protects the high pressure side of the refrigerant system. The HPC switch shuts down the compressor by removing the 24 VAC control signal from the compressor contactor when the pressure exceeds the preset value of the switch. The HPC has a manual reset button.

The Low Pressure Cutout (LPC) is located on the suction side of the compressor. The LPC switch shuts down the compressor by removing the 24 VAC control signal from the compressor contactor when the pressure falls below the preset value of the switch.

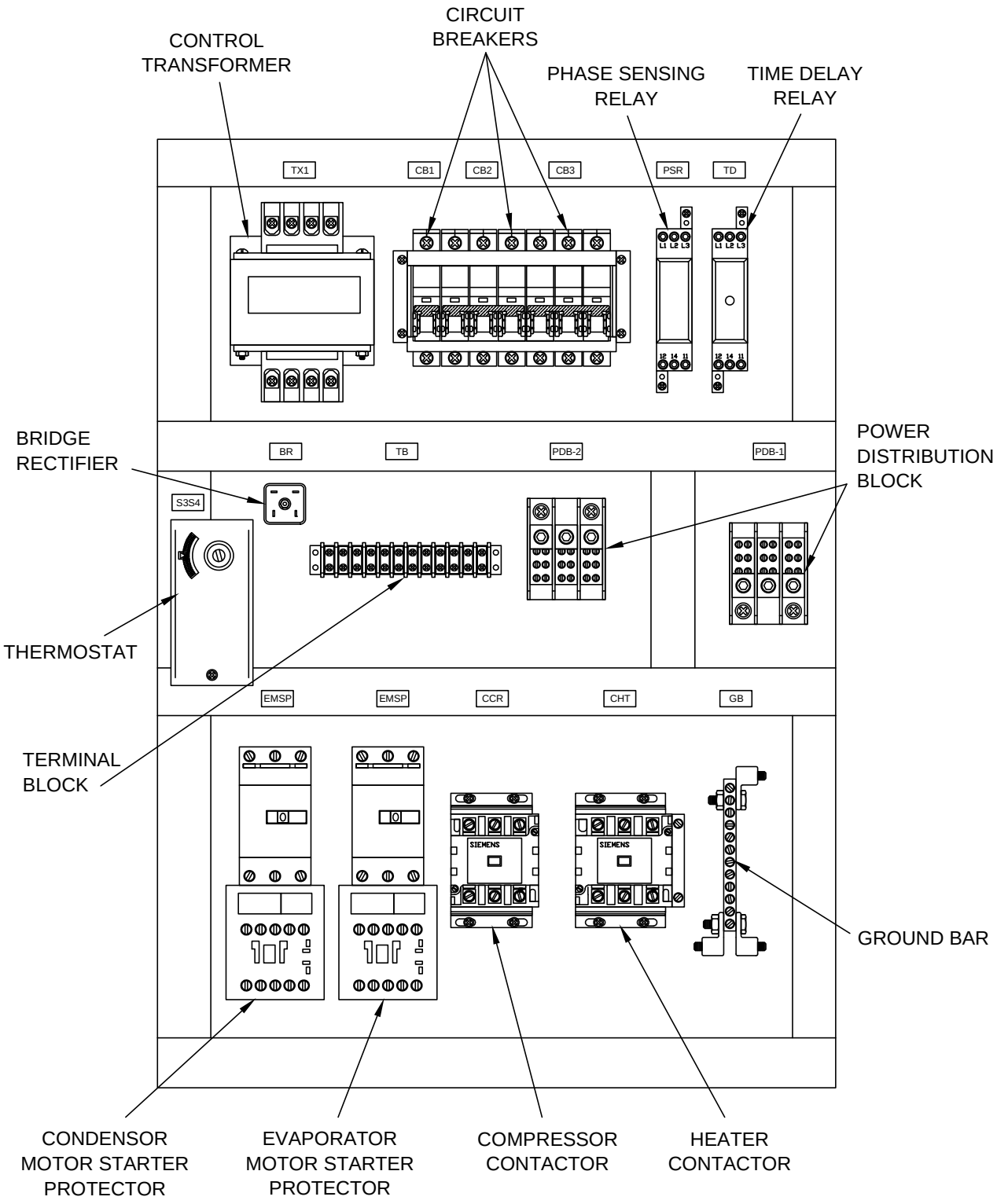


Figure 10. ECU (Version 1) Control Panel Component Location.

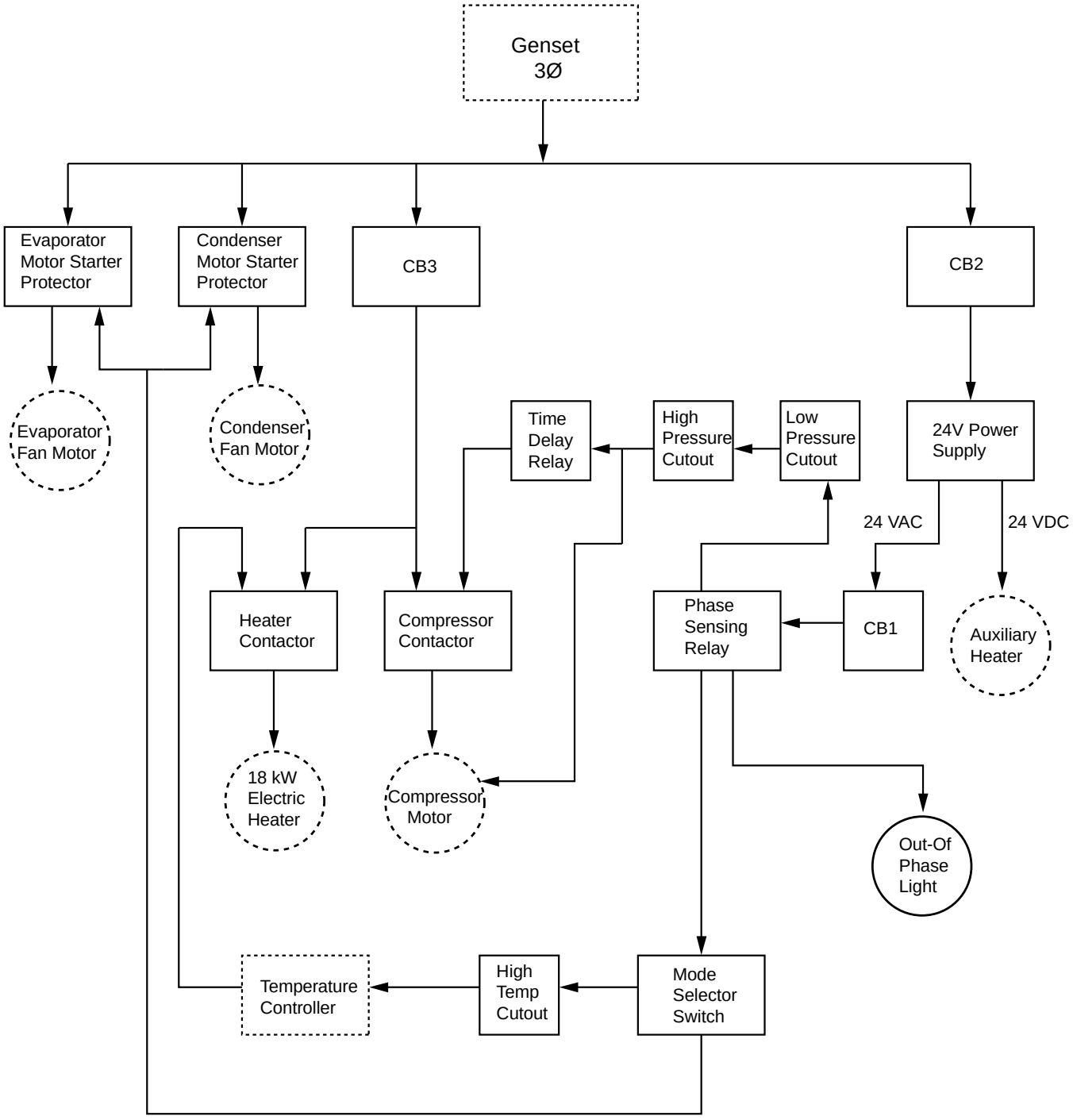


Figure 11. Power Distribution/Fault System (Version 1).

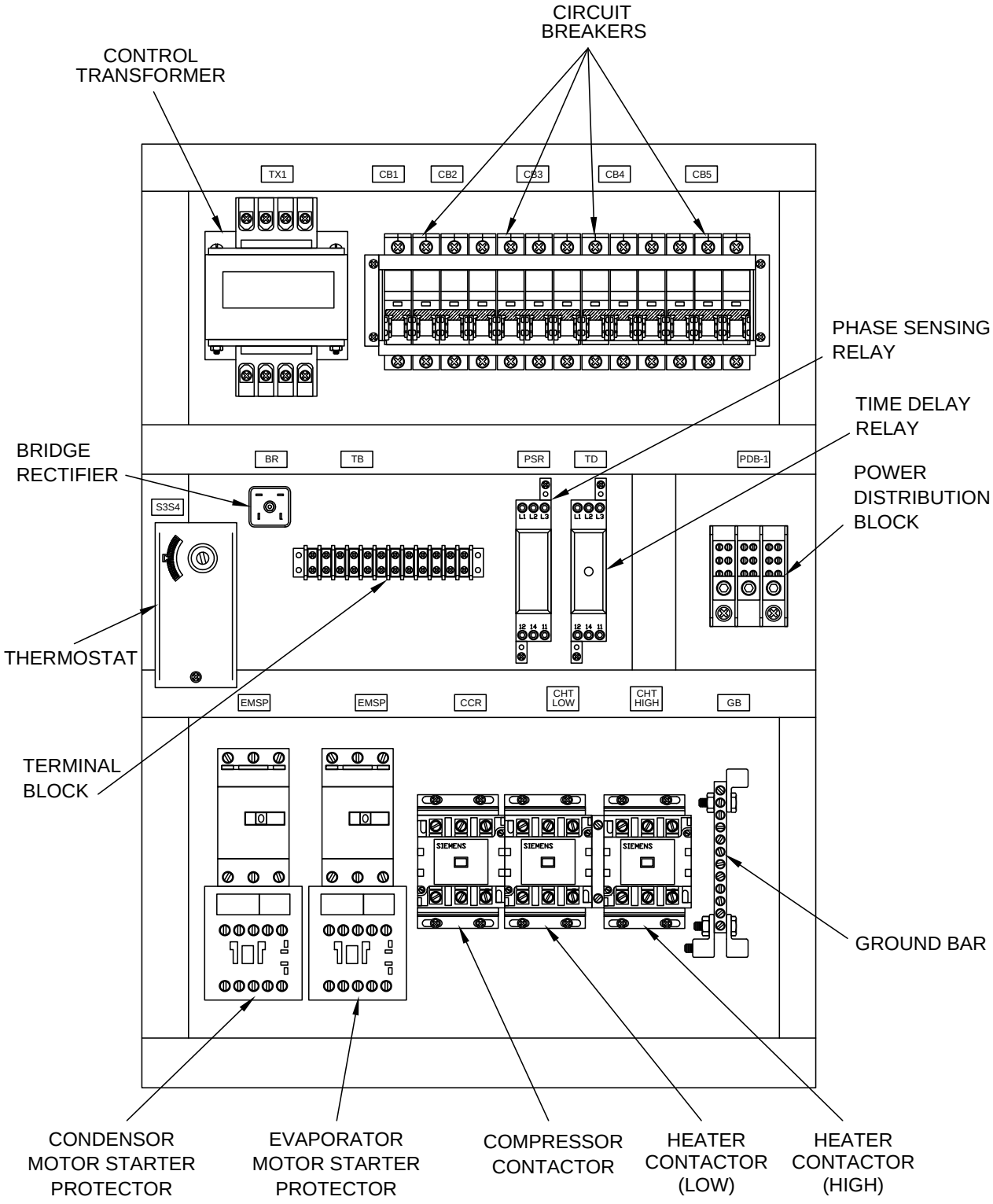


Figure 12. ECU (Version 2) Control Panel Component Location.

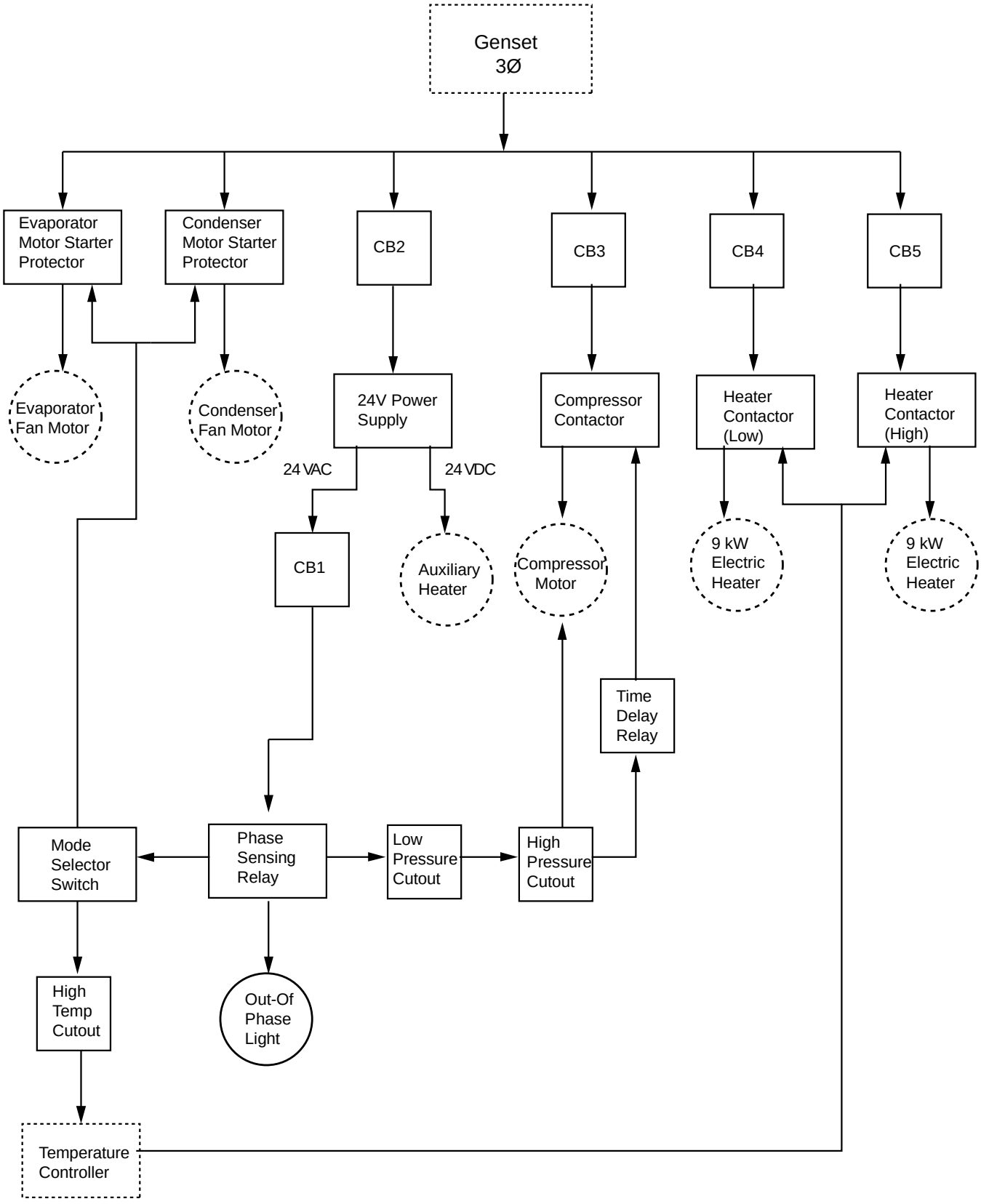


Figure 13. Power Distribution/Fault System (Version 2).

Heating System

NOTE

Refer to (Figures FO-1 and FO-2) for electrical schematic and wiring diagrams of the ECU (Version 1). Refer to (Figures FO-3 and FO-4) for electrical schematic and wiring diagrams of the ECU (Version 2).

The Heating System consists of the following:

ECU (Version 1)

- Temperature Control
- CB3 power to 18 kW heater coil and compressor motor
- Heater contactor
- Evaporator blower fan
- Baffle

ECU (Version 2)

- Temperature Control
- CB3 power to compressor motor
- CB4 power to 9 kW heater coil, low (V2)
- CB5 power to 9 kW heater coil, high (V2)
- Heater contactor, low
- Heater contactor, high
- Evaporator blower fan
- Baffle

The temperature control is set by the operator and senses the air temperature in the return duct. It applies a 24 VAC control line to the appropriate contactor for heating or cooling to maintain the operator setting.

For the Version 1 (V1) ECU, CB3 supplies power to both the 18 kW heater coil and compressor motor. The Heater Contactor (CHT) switches the line power to the coil when demanded by the 24 VAC control line.

For the Version 2 (V2) ECU, CB3 supplies power to the compressor motor. CB4 and CB5 supply power to the 9 kW low heat and 9kW high heat coils respectively. Heater Contactor (CHT) Low switches line power to the low heat coil and CHT High switches power to the high heat coil. When the Mode Select Switch (MSS) is set to High Heat both coils are switched on to supply 18 kW heat.

The evaporator blower fan is a one speed blower. It forces warmed air through the duct work during the heat mode and cooled air when in cool mode. The baffle is located on the intake duct. Since the blower is a one speed fan the baffle is used to regulate air flow across the heater coils. Closing the baffle will cause greater heat transfer from the coils and increases heat output.

Auxiliary Heater System

The Auxiliary Heating System consists of the following:

- Hydronic heater
- Hydronic heater radiator
- Auxiliary heater switch
- Mode select switch
- Built-in self test

The auxiliary heater is a hydronic heater located in the condenser enclosure. It provides additional heat for extreme cold weather. The heater burns diesel fuel supplied by the generator fuel tank to warm a hot water radiator. It operates in either manual or automatic mode according to the AUXILIARY HEATER select switch.

The Mode Select Switch (MSS) determines how the heater operates in conjunction with the main heating and cooling systems. With the MSS switch set to HEAT (V1) or HEAT LOW/HIGH (V2) the auxiliary heater can be used to provide additional heat to the TMSS-MED shelter. With the MSS switch set to OFF the heater can be used to thaw out the evaporator motor in extreme cold weather operation. The auxiliary heater is disabled when the MSS switch is set to COOL.

The auxiliary heater has built-in circuits to continually monitor operation. In the event of an operational failure a flash code is generated and displayed on the AUXILIARY HEAT switch. Refer to (Table 2, WP 0030) for a list of the fault indications.

Cooling System (Refrigeration)

NOTE

Refer to (Figure FO-5) for a refrigeration schematic of the ECU.

The components of cooling system and their interaction are described below. Use refrigeration schematic (FO-5) to identify components and trace fluid flow. The refrigeration components of the cooling system consist of the following:

- Compressor
- Vibration isolators
- Condenser fan
- Condenser coils
- Quench valve
- Filter/Dryer
- High pressure relief valve
- Service port (Hi & Lo)
- Sight glass
- Hot gas-bypass valve
- Solenoid valve
- Thermal expansion valve and distributor
- Evaporator fan
- Evaporator coils

The Compressor (CMP) compresses refrigerant in the closed system. The pressure differential across the low pressure suction side and high pressure discharge side causes circulation. The Vibration Isolators (VI) decrease stress on the copper refrigerant lines created by transmission of compressor induced vibration. The input and output lines are also protected by high pressure and low pressure cutoff switches which shut down the compressor in the event of a pressure fault.

The Condenser Fan (CF) draws cool ambient air into the condenser enclosure. The air is then passed through and warmed by the Condenser Coils (CC). The fan then forces the warm air to exit through the coils. The condensation process converts the high pressure gas into a high pressure liquid.

The liquid refrigerant from the condenser passes through a Filter/Dryer (F/D) which removes any water vapor or debris. The F/D stops contaminants from clogging the Thermal Expansion Valve and Distributor (TEV/D). The TEV/D allows fluid to enter the evaporator at a controlled pressure. It meters the flow of high pressure liquid refrigerant, so the evaporator coils can maintain the correct amount of refrigerant required for the superheat process. The TEV/D valve is regulated by a sensing bulb that is attached to the output of the evaporator (suction side). The sensing bulb must maintain good thermal contact with the suction line for accurate operation. The bulb is also insulated to provide more accurate feedback.

A High Pressure Relief Valve (HPRV) is located downstream of the F/D before the high pressure service port. The HPRV acts as a safety to vent fluid from the system, releasing pressure before the bursting point of the copper tubing is reached. Since the copper utilized in the refrigeration system has a 600 lb bursting pressure rating the HPRV valve is set to open at 550 psig.

The Sight Glass (SG) provides a window into the liquid flow where service personnel can observe fluid condition. Bubbles occurring in the SG are one indication of an ECU failure.

The Solenoid Valve (SV) is opened and closed by the temperature controller allowing fluid to enter the evaporator. It is part of a feedback loop between the temperature controller and the temperature sensor located in the duct leading to the TMSS-MED shelter.

The evaporator fan, more appropriately called supply fan, operates in both cool and warm modes. For cool mode, warm shelter air is cooled by the evaporator coils and blown back into the shelter by the fan. For warm mode, cool shelter is warmed by the heater elements and forced back into the shelter. The evaporator coils are constructed of copper tubing with series of soft aluminum fins attached to increase heat transfer. As refrigerant passes through the coils, it absorbs heat from the surrounding air thereby cooling it. Another result of the transfer process is lower refrigerant pressure with a return to the gaseous state. A low pressure service port is located on the suction side of the evaporator coils between the evaporator and compressor.

Cooling System (Refrigeration) – Continued

The Hot Gas Bypass Valve (HGBV) is a pressure actuated mechanical valve. It keeps the pressure from dropping to low, on the suction side, and requiring long compression cycles to bring the pressure back up, on the discharge side. The valve is regulated by an equalization line that is attached to the low pressure line. A drop in pressure within the low pressure line, below 55 psig, causes the valve to open. The valve then allows hot compressed gas, from the discharge line of the compressor, to bypass the condensing and evaporator coils and return to the low pressure line directly.

The Quench Valve (QV) is controlled by both a temperature sensing bulb and pressure equalization line. When the valve is opened, cool refrigerant from condenser is allowed to mix with the hot bypass gas. The sensing bulb opens the valve when the superheat value of 20°F is reached. The equalization line then regulates how far to open the valve to maintain the superheat value.

TRAILER

Hydraulic Brake System

The hydraulic brakes are controlled by a surge actuator system. The rolling momentum of the trailer forces the surge actuator to compress during braking. The actuator applies pressure to the hydraulic cylinder synchronizing the towing vehicle and trailer brakes. The actuator also applies the brakes if the trailer breaks away from the towing vehicle.

The Hydraulic Brake System consists of the following:

- Hydraulic brake actuator assembly
- Hydraulic brake tube assemblies
- Brake hose assembly
- Wheel brake components

The major components of the hydraulic brake system and their functions are as follows:

Lunette Ring - attaches to the towing vehicle pintle hook. The lunette ring controls the master cylinder assembly. When the towing vehicle goes forward, the lunette ring is pulled and the brakes are released. When the towing vehicle slows down, the weight of the trailer pushes the lunette ring into the towing vehicle and the brakes are applied.

Master Cylinder Assembly – changes mechanical motion of the lunette ring and breakaway lever into hydraulic pressure. It has a built in shock absorber to prevent jerky lunette ring movement. The damper also slows the rate of the hydraulic pressure increase when the towing vehicle backs up, thus allowing the trailer to be slowly backed up for short distances on level terrain.

Breakaway Chain – attaches to towing vehicle. It will pull the breakaway lever up if the trailer and the towing vehicle uncouple.

Breakaway Lever – controls the master cylinder. When the lever is up, the brakes are applied. When it is down, the lunette controls the master cylinder.

Leaf Spring – holds the breakaway lever up. The breakaway lever must be reset any time it has been pulled up.

Hydraulic Brake Tubes and Hoses – transfer hydraulic pressure from the master cylinder assembly to the wheel cylinder.

Wheel Cylinder – changes hydraulic pressure into mechanical motion. When the wheel cylinder is pressurized, it pushes the brake shoes against the brake drum.

END OF WORK PACKAGE

CHAPTER 2

OPERATOR INSTRUCTIONS FOR TMSS-MED

OPERATOR INSTRUCTIONS
TMSS-MED
DESCRIPTION AND USE OF OPERATOR CONTROLS, INDICATORS, AND CONNECTORS

GENERAL

This work package contains illustrations and tables that describe the location and function of each control, indicator, and connector used for operation of TMSS-MED Trailer. Each major panel is shown in detail in (Figures 1 through 7) and their functions described in associated tables.

GENSET CONTROL PANEL (TOP PANEL)

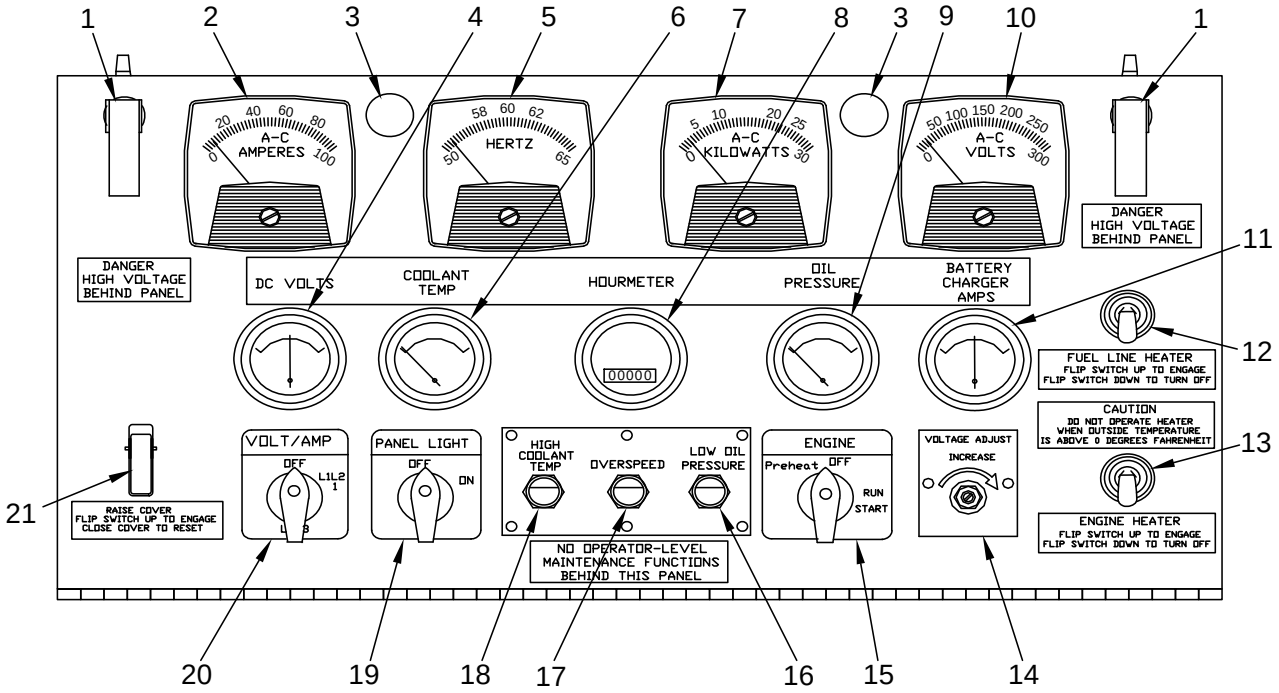


Figure 1. Genset Control Panel (Top Panel) – Controls, Indicators, and Connectors.

Table 1. Genset Control Panel (Top Panel) – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	Panel Latch	Enables access to electrical enclosure behind Control Panel FOR AUTHORIZED TECHNICIANS ONLY.
2	A-C AMPERES meter	Indicates current drawn (Amps) from Genset.
3	Panel lights	Two panel lights illuminate Genset Control Panel.
4	DC VOLTS meter	Indicates 16-36 VDC voltage from battery system.
5	HERTZ meter	Indicates operating frequency (Hz) generated by Genset.
6	COOLANT TEMP meter	Indicates engine coolant temperature.

Table 1. Genset Control Panel (Top Panel) – Controls, Indicators, and Connectors – Continued.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
7	A-C KILOWATTS meter	Indicates power draw on Genset.
8	HOURMETER	Total Hours Accumulated - Indicates total operating hours of engine.
9	OIL PRESSURE meter	Indicates engine oil pressure in pounds per square inch (psi).
10	A-C VOLTS meter	Indicates operating voltage (V) generated by Genset.
11	BATTERY CHARGER AMPS meter	Indicates rate of charging current to battery system from Genset.
12	FUEL LINE HEATER switch	Pre-heats engine fuel for operation in cold weather climates where ambient temperatures are below 0°F (-17.77°C).
13	ENGINE HEATER switch	Starts auxiliary engine block heater within Genset for cold weather starting down to -50ºF (-45.55°C). ENGINE HEATER flashes - A engine heater (hydronic) fault is present. For indicator functions see (Table 2 in WP 0012).
14	VOLTAGE ADJUST potentiometer	Enables manual adjustment of Genset output voltage.
15	ENGINE selector switch	Four-position switch controls engine operation. PREHEAT - allows cold engine glow plugs to warm up before attempting to start engine. OFF - Shuts down engine. RUN – Allows engine to run once glow plugs have warmed up. START – Energizes engine once glow plugs have warmed up.
16	LOW OIL PRESSURE light	Illuminates red if engine shuts down on low oil pressure.
17	OVERSPEED light	Illuminates red if engine shuts down from an over-speed condition.
18	HIGH COOLANT TEMP light	Illuminates red if engine shuts down from high coolant temperature.
19	PANEL LIGHT switch	Turns on panel lights. Turns off lights when released.
20	VOLT/AMP select switch	Four-position switch selects any two legs of Genset output for AC Ammeter and Voltmeter readings. OFF – Disconnects A-C AMPERES and A-C VOLTS meters from circuit. L1/L2 – Allows the A-C AMPERES and A-C VOLTS meters to indicate current and voltage present between legs L1 and L2. L2/L3 – Allows the A-C AMPERES and A-C VOLTS meters to indicate current and voltage present between legs L2 and L3. L3/L1 – Allows the A-C AMPERES and A-C VOLTS meters to indicate current and voltage present between legs L1 and L3.
21	BATTLE SHORT switch	Overrides system shutdown protection devices to keep Genset operating.

GENSET CONTROL PANEL (BOTTOM PANEL)

NOTE

The door covering the circuit breakers has been removed for clarity.

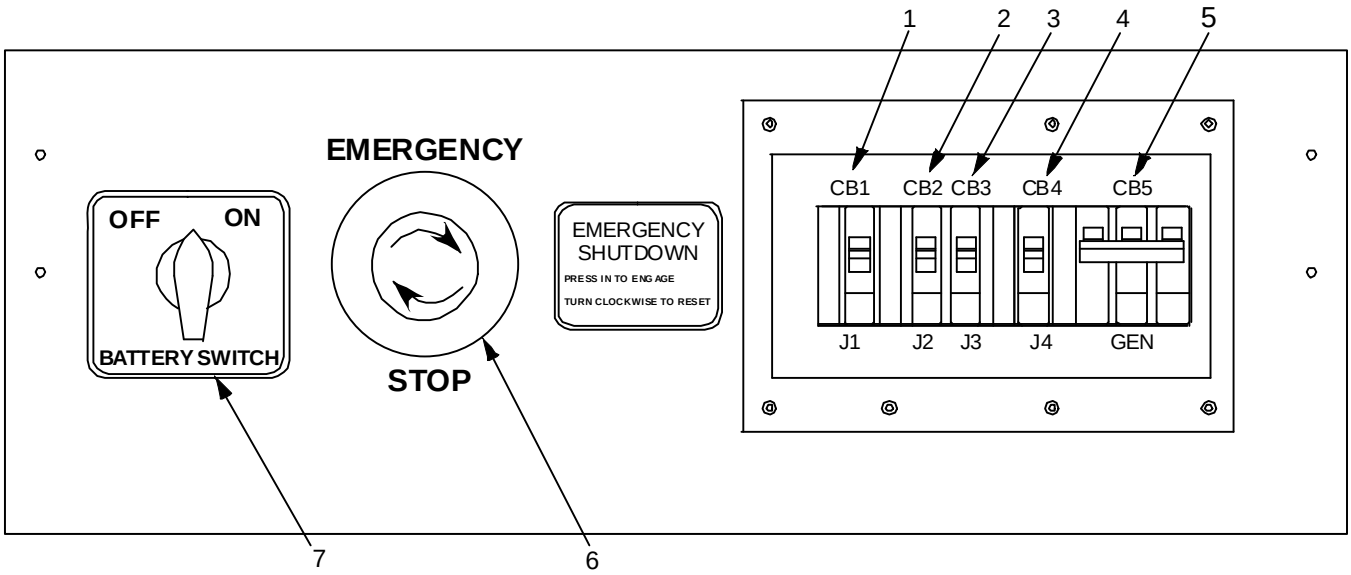


Figure 2. Genset Control Panel (Bottom Panel) – Controls, Indicators, and Connectors.

Table 2. Genset Control Panel (Bottom Panel) – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	CB1 J1 circuit breaker	3-Pole 60A protects ECU from over-power conditions.
2	CB2 J2 circuit breaker	1-Pole 20A protects 120 VAC outlet J2 at Power Distribution Panel.
3	CB3 J3 circuit breaker	1-Pole 20A protects 120 VAC outlet J3 at Power Distribution Panel.
4	CB4 J4 circuit breaker	3-Pole 30A protects additional load from over-power conditions.
5	CB5 GEN circuit breaker	3-Pole 90A protects loads connected to Genset from over-power.
6	EMERGENCY STOP button.	Push button immediately shuts down Genset.
7	BATTERY SWITCH	OFF – ON switch disconnects battery power to control panel.

GENSET POWER DISTRIBUTION PANEL

NOTE

The old version of the Power Distribution Panel is covered in (Figure 3 and Table 3. For updated version, refer to (Figure 8 and Table 8).

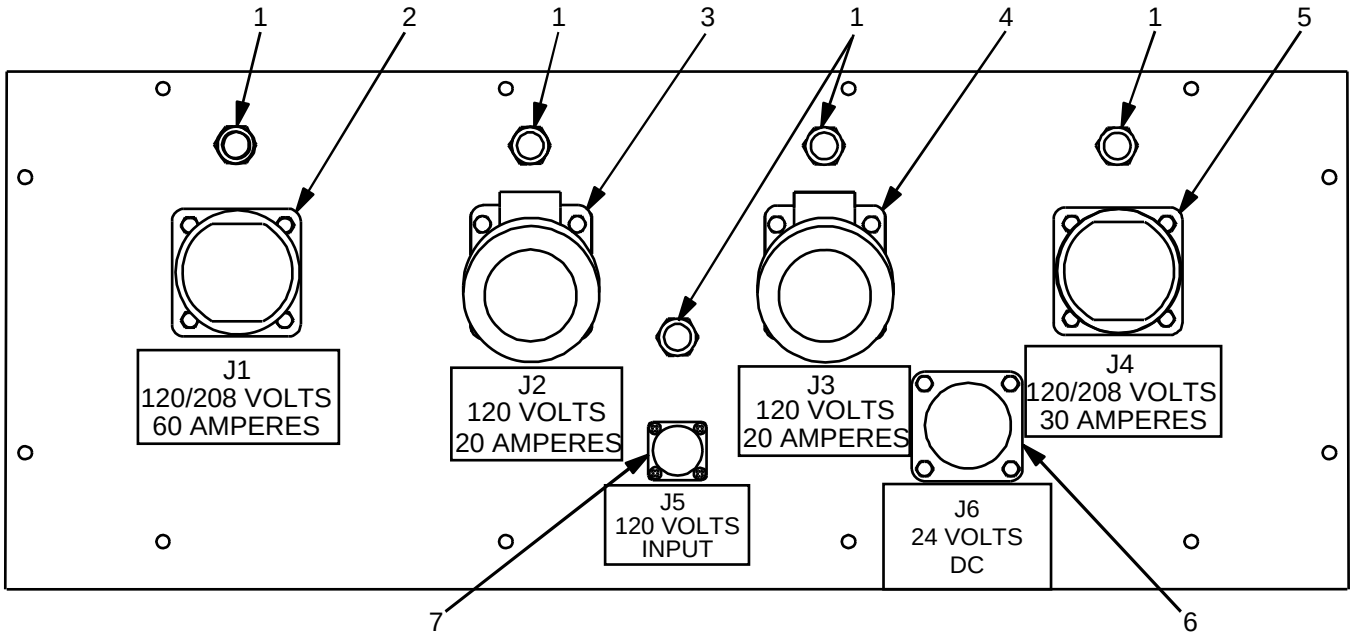


Figure 3. Power Distribution Panel – Controls, Indicators, and Connectors.

Table 3. Power Distribution Panel – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	Amber indicator lamps	(Blackout) Push-to-test indicates power is present at the respective receptacle.
2	J1 120/208 VOLTS 60 AMPERES receptacle	Provides generator power for ECU.
3	J2 120 VOLTS 20 AMPERES receptacle	Provides AC power for shelter lighting and utility outlets.
4	J3 120 VOLTS 20 AMPERES receptacle	Provides AC power for shelter lighting and utility outlets.
5	J4 120/208 VOLTS 30 AMPERES receptacle	Provides AC power outlet for general use.
6	J6 24 VOLTS DC receptacle	NATO/Slave receptacle accepts 24 VDC power for emergency starting from an external source or provides 24 VDC power to an external requirement.
7	J5 120 VOLTS INPUT receptacle	Allows battery charging from a 120 VAC external source. The five foot battery charger cable connects to this receptacle.

FUEL CONTROL PANEL

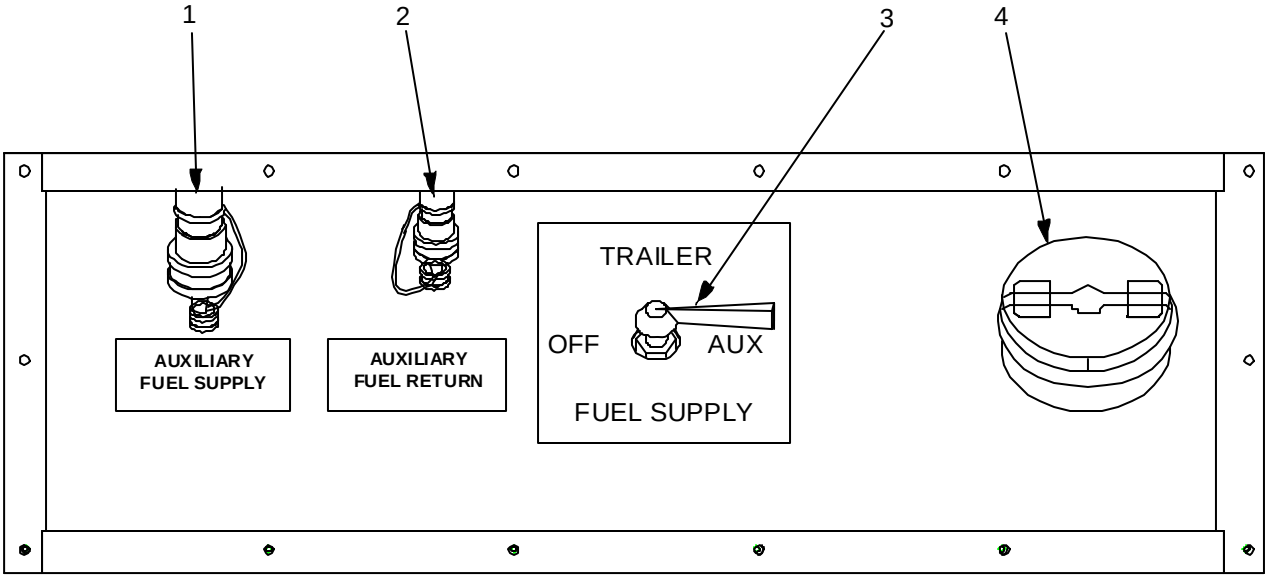


Figure 4. Fuel Control Panel – Controls, Indicators, and Connectors.

Table 4. Fuel Control Panel – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	AUXILIARY FUEL SUPPLY connector	Quick connect/disconnect fitting and bulb primer to deliver fuel from external source.
2	AUXILIARY FUEL RETURN connector	Quick connect/disconnect fitting to maintain static air pressure within fuel system and external fuel source.
3	FUEL SUPPLY switch	Three position switch which closes fuel supply or selects fuel supply source. OFF position if fuel system is being serviced or if engine is not going to be run for an extended period of time. TRAILER position if engine is to run from trailer fuel tank. AUX position if engine is to run from an auxiliary fuel supply.
4	Filler cap	Covers pipe for putting fuel into fuel tank.

FUEL GAUGE

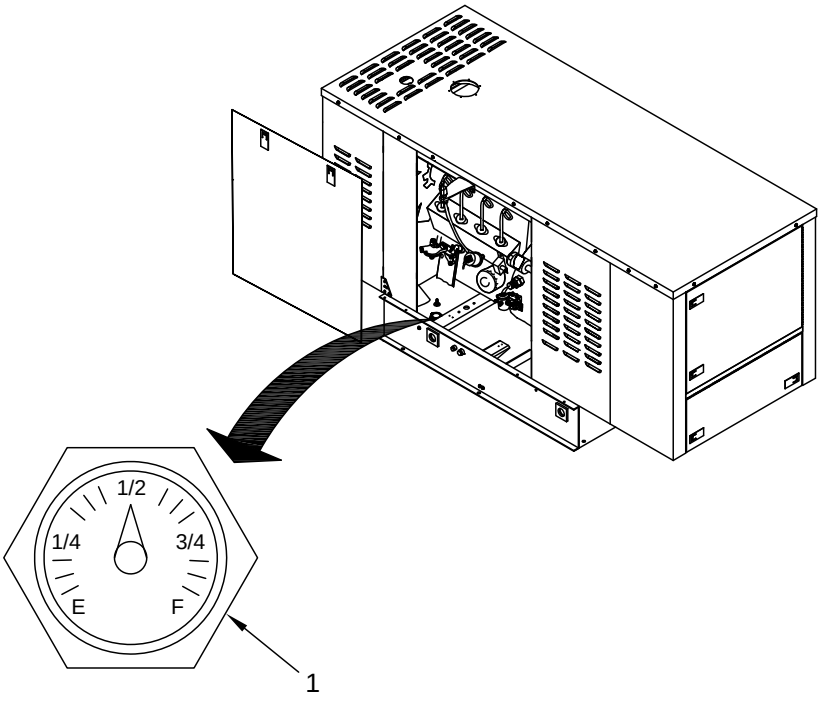


Figure 5. Fuel Gauge – Controls, Indicators, and Connectors.

Table 5. Fuel Gauge – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	Fuel Gauge	Gives indication of fuel present in Genset fuel tank.

ECU CONTROL PANEL

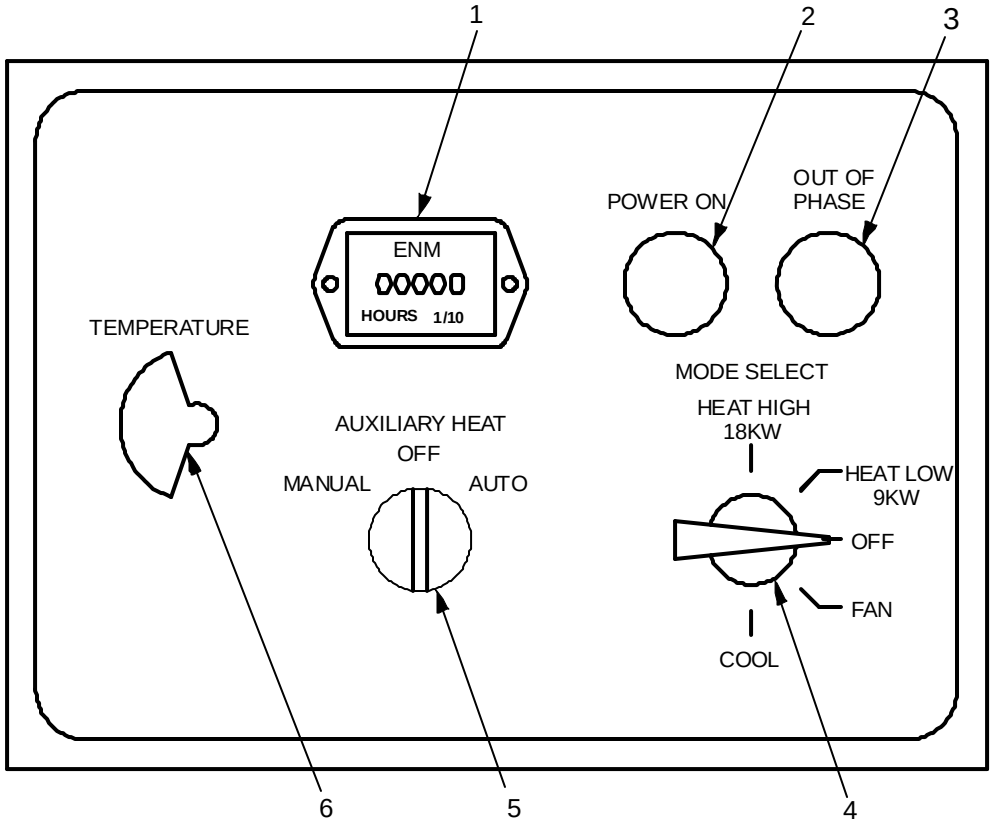


Figure 6. ECU Control Panel – Controls, Indicators, and Connectors.

Table 6. ECU Control Panel – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	Hour-meter	Indicates total number of run-time hours on ECU.
2	POWER ON indicator light	Illuminates green when power is present in the unit.
3	OUT OF PHASE indicator light	Illuminates red when power source (i.e. Genset, shore power) is incorrectly phased.
4	MODE SELECT switch	Five-position switch selects mode of operation. HEAT HIGH/18KW - Provides heated air to be circulated through the ducts. Draws near maximum electrical power from the Genset. HEAT LOW/9KW - Provides heated air to be circulated through the ducts. Draws approximately one-half maximum electrical power from the Genset. OFF - De-energizes the ECU. FAN - Provides fresh air only through the ducts. COOL - Provides conditioned air to be circulated through the ducts. The ECU draws approximately one-half maximum electrical power from the Genset.

Table 6. ECU Control Panel – Controls, Indicators, and Connectors – Continued.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
4 (cont.)	MODE SELECT switch	Certain models have a four-position switch (HEAT-OFF-FAN-COOL) that selects mode of operation. Their functions are: Four-position switch selects mode of operation. HEAT – Selects heat mode of ECU utilizing 18 KW of power from the Genset. OFF – De-energizes the ECU. FAN – Provides fresh air only through the ducts. COOL – Provides conditioned air to be circulated through the ducts. The ECU draws 18 KW of power in this mode.
5	AUXILIARY HEAT indicator/switch light	Three position switch which selects mode of operation. MANUAL – Continuous heat to shelter. OFF – No heat to shelter. AUTO – Thermostatically controlled heat to shelter. AUXILIARY HEAT flashes - A hydronic heater fault is present. See indicator functions (Table 2 in WP 0011 or WP 0030).
6	TEMPERATURE dial	Allows operator to manually regulate shelter interior temperature.

PDU CONTROL PANEL

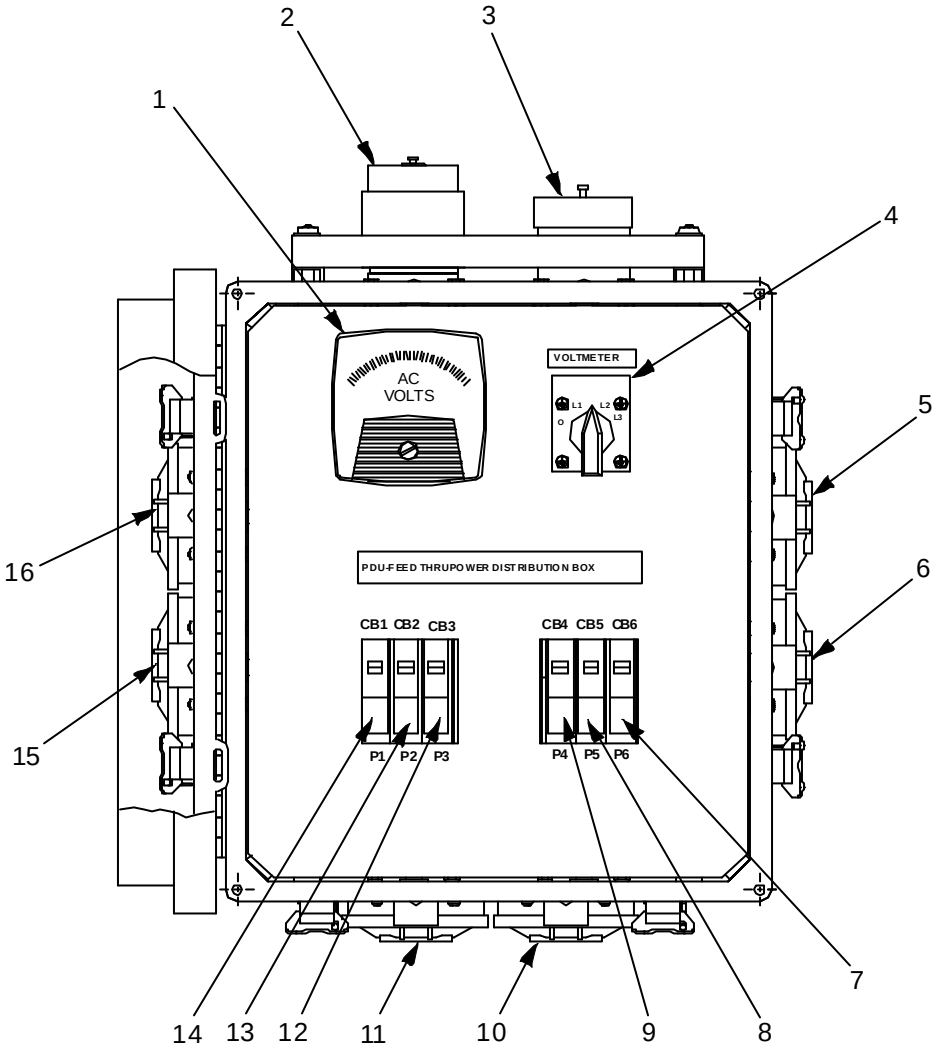


Figure 7. PDU Control Panel – Controls, Indicators, and Connectors.

Table 7. PDU Control Panel – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	AC VOLTS meter	Indicates operating voltage of selected phase (L1, L2, L3).
2	J1 INPUT POWER 120/208 VAC 3 PHASE connector	Provides connection for input of 208 VAC into PDU.
3	J2 OUTPUT POWER 120/208 VAC 3 PHASE	Provides connection for output of 208 VAC.
4	VOLTMETER select switch	Voltmeter selector switch selects phase (L1, L2, L3) to be measured by AC VOLTS meter.
5	P3 120 VOLTS 30 AMPERES connector	Provides connection for output of 120 VAC when CB1 is energized.

Table 7. PDU Control Panel – Controls, Indicators, and Connectors – Continued.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
6	P4 120 VOLTS 20 AMPERES connector	Provides connection for output of 120 VAC when CB4 is energized.
7	CB6/P6 circuit breaker	Single pole 20A GFI circuit breaker for output load protection of P6.
8	CB5/P5 circuit breaker	Single pole 20A GFI circuit breaker for output load protection of P5.
9	CB4/P4 circuit breaker	Single pole 20A GFI circuit breaker for output load protection of P4.
10	P6 120 VOLTS 20 AMPERES connector	Provides connection for output of 120 VAC when CB6 is energized.
11	P5 120 VOLTS 20 AMPERES connector	Provides connection for output of 120 VAC when CB5 is energized.
12	CB3/P3 circuit breaker	Single pole 30A GFI circuit breaker for output load protection of P3.
13	CB2/P2 circuit breaker	Single pole 20A GFI circuit breaker for output load protection of P2.
14	CB1/P1 circuit breaker	Single pole 20A GFI circuit breaker for output load protection of P1.
15	P2 120 VOLTS 20 AMPERES connector	Provides connection for output of 120 VAC when CB2 is energized.
16	P1 120 VOLTS 20 AMPERES connector	Provides connection for output of 120 VAC when CB1 is energized.
17	Indicator light (not shown)	Each connector has a light which illuminates when power is present at connector.

GENSET POWER DISTRIBUTION PANEL – (UPDATED VERSION)

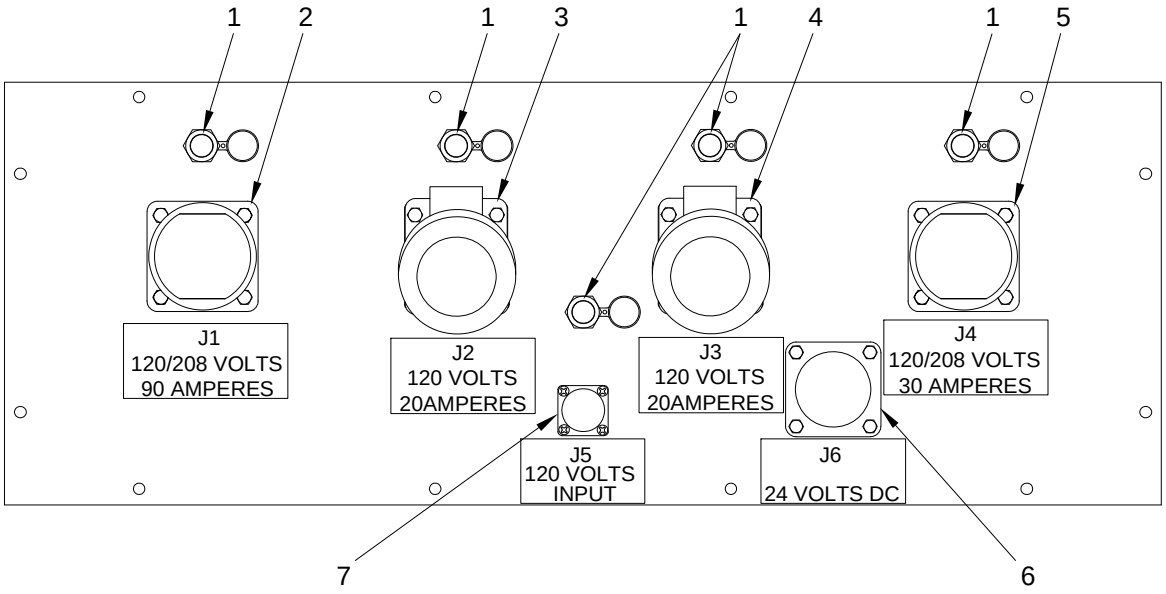


Figure 8. Power Distribution Panel - Controls, Indicators, and Connectors (Updated Version).

Table 8. Power Distribution Panel - Controls, Indicators, and Connectors (Updated Version).

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	Amber indicator lamps with blackout covers	(Blackout) Swivel-to-test indicates power is present at respective receptacle.
2	J1 120/208 VOLTS 90 AMPERES receptacle	Connects generator to ECU.
3	J2 120 VOLTS, 20 AMPERES receptacle	Provides AC power for shelter lighting and utility outlets.
4	J3 120 VOLTS, 20 AMPERES receptacle	Provides AC power for shelter lighting and utility outlets.
5	J4 120/208 VOLTS, 30 AMPERES receptacle	Provides AC power for general use.
6	J6 24 VOLTS DC receptacle	NATO/Slave receptacle accepts 24 VDC power for emergency starting from an external source or provides 24 VDC power to an external requirement.
7	J5 120 VOLTS INPUT receptacle	Allows battery charging from a 120 VAC external source. The five foot battery charger cable connects to this receptacle.

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS
TMSS-MED
OPERATION UNDER USUAL CONDITIONS

INITIAL SETUP:

Tools and Special Tools
Field repair kit

Personnel Required
Four to six

References
WP 0004, WP 0006, WP 0009, WP 0010, WP 0011, WP 0019, WP 0030

GENERAL

The following WP covers site selection, setup, and initial power-up procedures of the TMSS-MED shelter and trailer system. The manual also covers power-down, teardown, and storing of the system.

SECURITY MEASURES FOR ELECTRONIC DATA

Follow the security measures described in AR 25-2, Information Assurance, to control access to classified electronic data. For the TMSS-MED system, follow the procedures described in the current version of the User Security Manual/Standard Operating Procedure (USM/SOP).

SITE REQUIREMENTS

To ensure minimal problems and good operation of the TMSS-MED system, ensure area is:

- Dry
- Level with minimum clearing of 39 feet (11.88 meter) x 39 feet (11.88 meter) for deployment and operation of trailer, shelter, and any associated equipment (Figure 1).
- Free of hazards (e.g., trees, buildings, or other structures), that would cause physical interference with the system and any associated equipment.
- Free of any obstructions that would interfere with the air intakes and exhausts of the ECU and Genset.

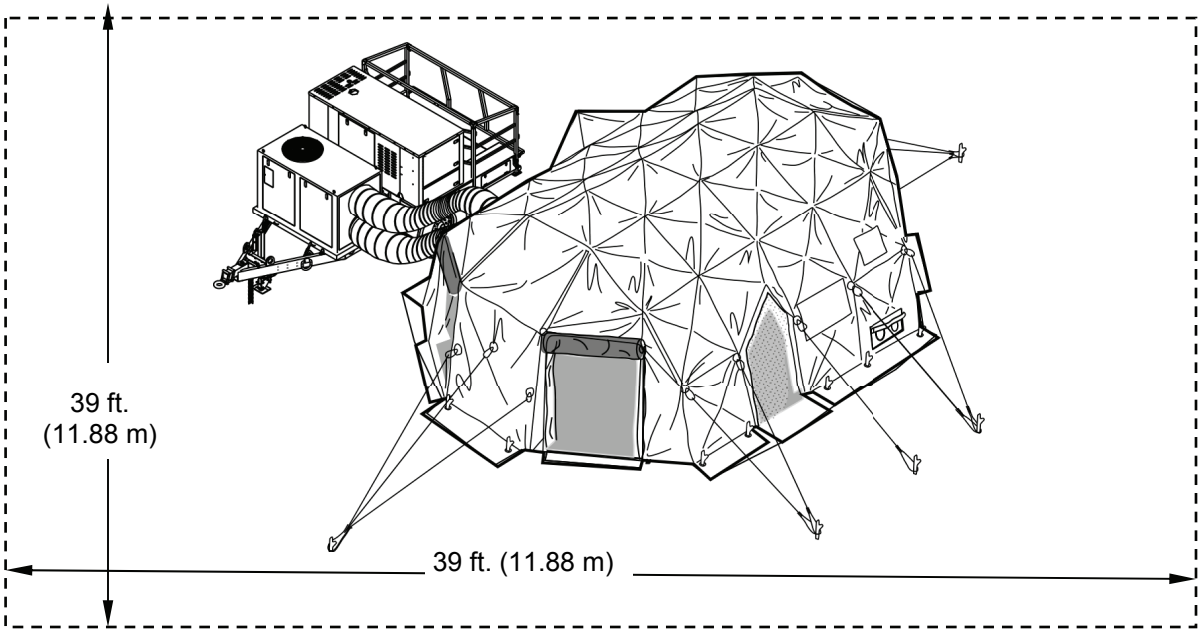


Figure 1. TMSS-MED System Deployment Footprint.

ASSEMBLY AND PREPARATION FOR USE

Perform all set-up and PMCS procedures (WP 0019) before operating the trailer.

Review all tow vehicle operating instructions before coupling or uncoupling the trailer.

Review On-Vehicle Equipment Loading Plan (WP 0009) and become familiar with equipment location.

PREPARING SHELTER SITE

Verify that there is enough space to erect the shelter. The footprint of the shelter requires a clear space measuring 32 feet from end-to-end and 23 feet from side-to-side. This space must be free from all obstructions and should generally be level all around. (Figure 2) shows a diagram of the area required to site the shelter.

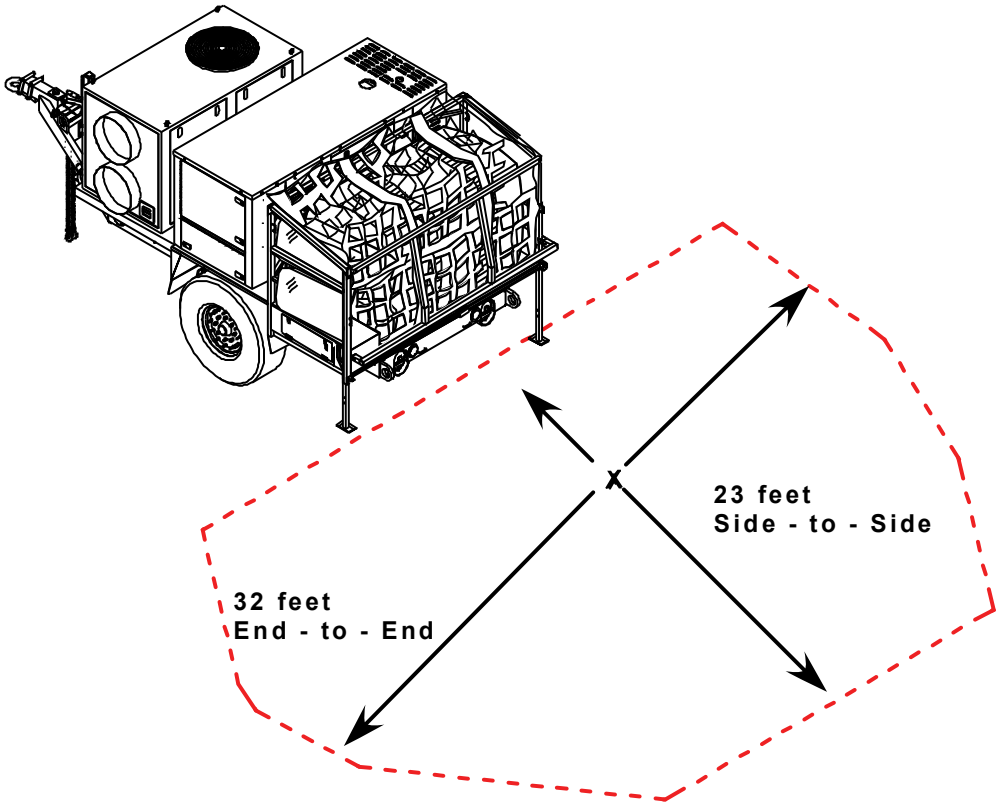


Figure 2. Shelter Site Dimensions.

TRAILER SETUP

Securing Trailer for Operation

WARNING

The TMSS-MED trailer must be level to prevent equipment damage.
Genset exhaust fumes must be directed away from the shelter, the trailer, and personnel.

1. After positioning trailer in an operational position, engage two handbrakes (Figure 3, Item 1).

2. Lower two rear stabilizer legs (Figure 3, Item 2). Place rear stabilizer pads as close to ground as possible.

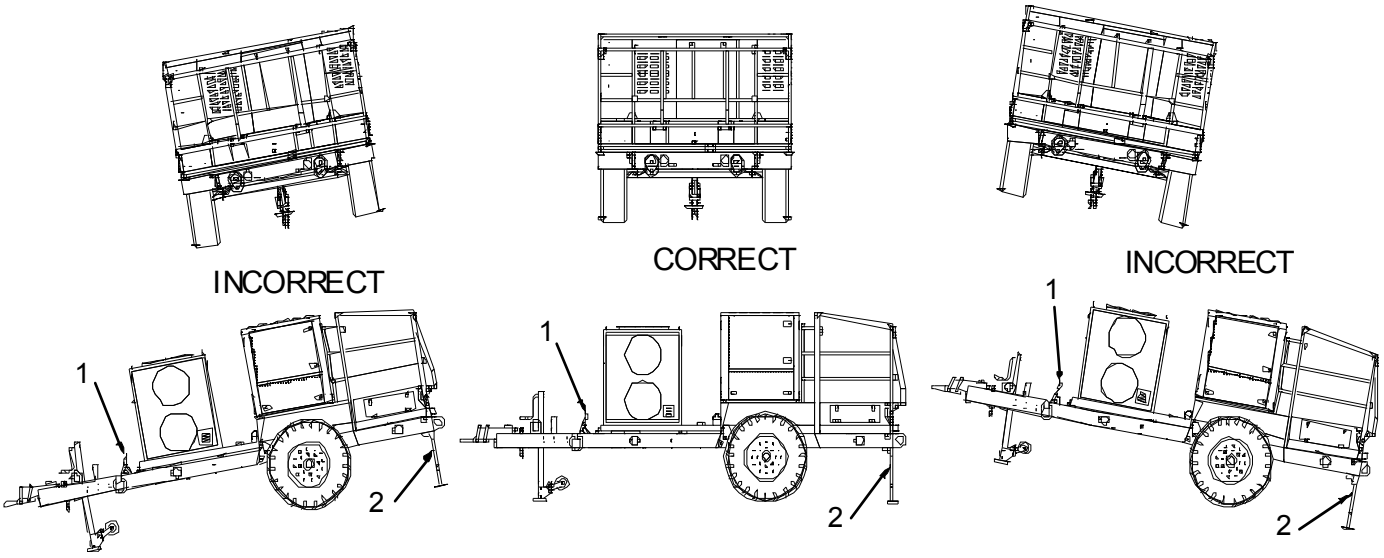


Figure 3. Correct Trailer Operating Positions.

NOTE

A combined wheel/skid plate assembly is provided with the trailer to maintain the trailer in a level operating position when the tow vehicle disconnects from the trailer. The wheel/skid plate assembly must be secured to the tongue jack before disconnecting the tow vehicle.

Use the skid plate to stabilize the trailer in most operating environments. Use the wheel when necessary to move short distances when the trailer needs to be repositioned without a tow vehicle.

If terrain around the trailer is soft, uneven, or generally unfavorable, do not use the wheel.

3. Remove two assembly pins (Figure 4, Items 3 and 4) holding wheel/skid plate assembly (Figure 4, Item 6) to storage post (Figure 4, Item 8).

4. Raise tongue jack post (Figure 4, Item 5) by rotating tongue jack hand crank (Figure 4, Item 7).

5. Position wheel/skid plate assembly so that either skid plate (INSET A) or wheel (INSET B) are facing the ground below the tongue jack post (Figure 4, Item 5). If wheel/skid plate assembly does not clear the ground, continue turning the tongue jack hand crank to raise the trailer.

Securing Trailer for Operation – Continued

6. Lift wheel/skid plate assembly up into tongue jack extension until wheel/skid plate clears ground and insert upper assembly pin (Figure 4, Item 4) in extension pin hole.

7. Insert lower assembly pin (Figure 4, Item 3) to secure wheel/skid plate assembly to tongue jack extension.

8. Rotate tongue jack hand crank to lower tongue jack post until trailer is supported by wheel or skid plate.

9. Extend two rear stabilizer legs (Figure 4, Item 2).

10. Check that bubble level on trailer indicates that trailer is level.

END OF TASK

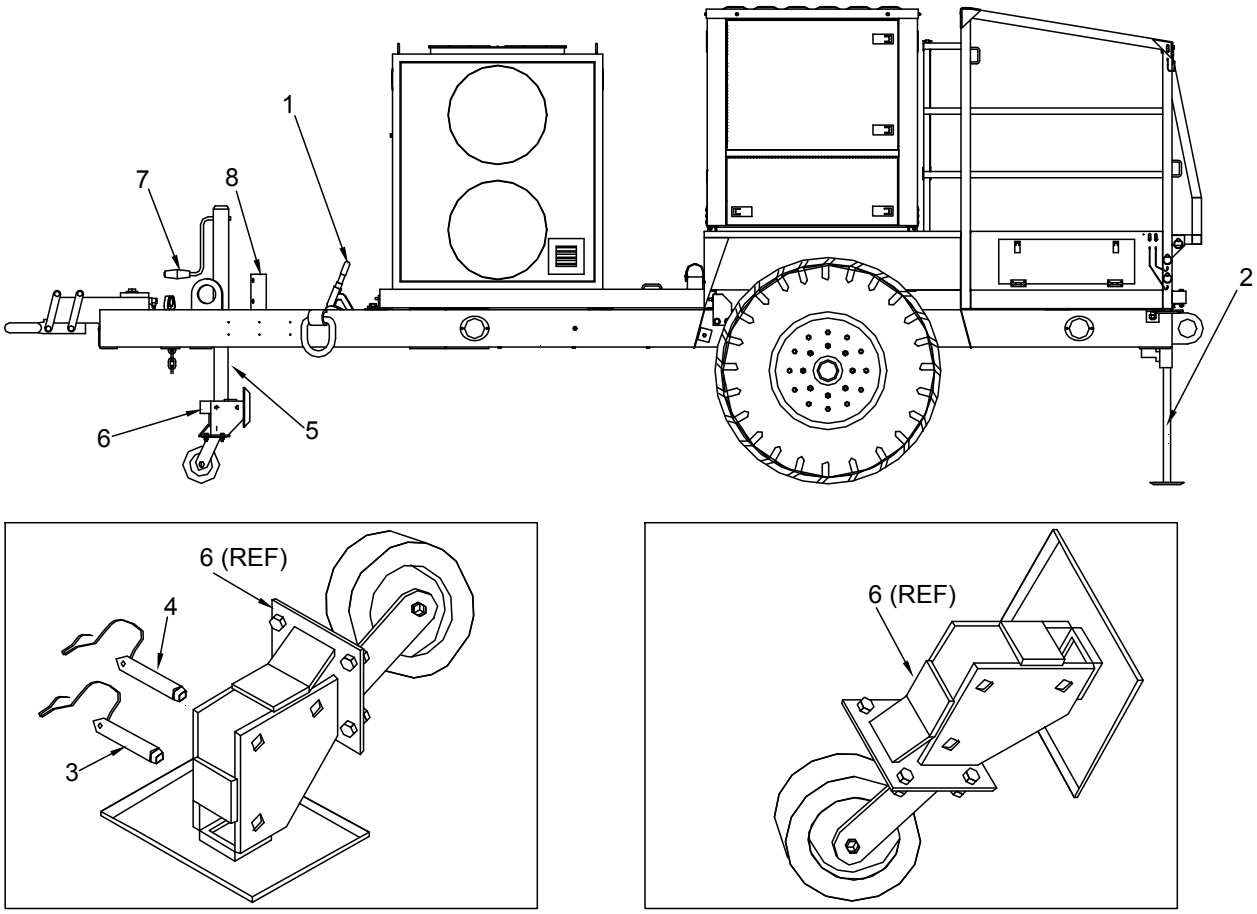


Figure 4. Wheel/Skid Plate Assembly Mounting Positions.

Chock Wheels

NOTE

Wheel chocks are not provided with equipment.

1. If trailer is parked on level ground and neither side of trailer needs to be raised, place one chock block (Figure 5, Item 1) in front of one tire and place another chock block (Figure 5, Item 2) in back of the other tire.

2. If trailer is parked on level ground and one side of trailer needs to be raised, place chock blocks (Figure 5, Item 3) in front and back of tire remaining on the ground.

3. If trailer is parked on an incline with tongue of trailer facing uphill, place chock blocks (Figure 5, Item 5) in back of both tires.

4. If trailer is parked on an incline with tongue of trailer facing downhill, place chock blocks (Figure 5, Item 4) in front of both tires.

END OF TASK

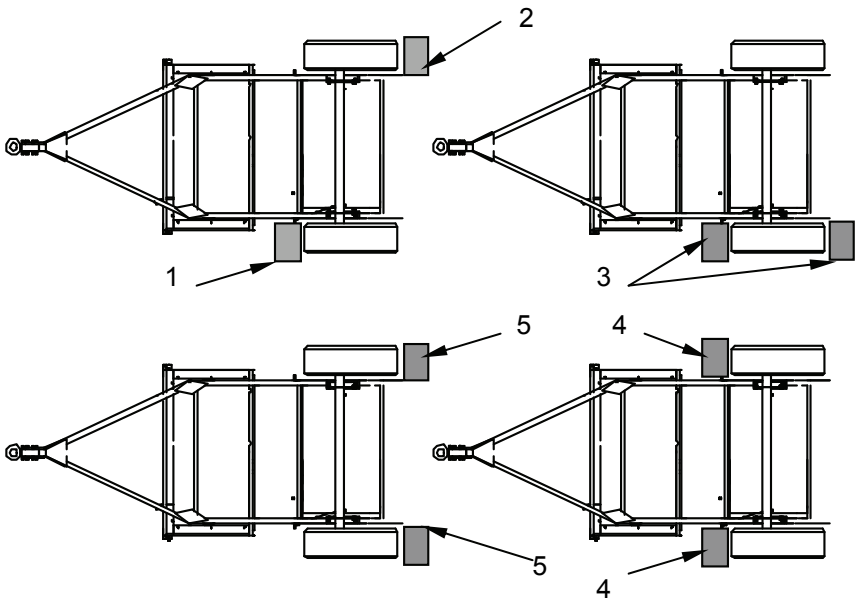


Figure 5. Wheel Chocks.

Uncouple Trailer from Towing Vehicle

WARNING

If trailer is loaded, rear stabilizer legs must be deployed prior to opening pintle hook. Failure to follow this warning may result in injury to personnel or damage to equipment.

1. Ensure two handbrakes (Figure 4, Item 1) are engaged.

2. Disconnect trailer inter-vehicular cable, safety breakaway cable, and safety chains from the towing vehicle.

3. Open towing vehicle pintle hitch by removing safety pin and lifting locking latch.

Uncouple Trailer from Towing Vehicle – Continued

WARNING

The trailer tongue is heavy – up to 420 lb (190.5 kg) loaded tongue weight. Use front crank to raise and lower trailer tongue. If tongue jack is inoperative, remove load from trailer and use four or more persons to lift trailer tongue. Failure to follow this warning may result in serious personnel injury or equipment damage.

4. Rotate trailer tongue jack hand crank (Figure 4, Item 7) to raise trailer tongue so that lunette ring is clear of pintle hook.

CAUTION

When operating hand crank, do not force tongue jack extension beyond normal operating range or permanent damage may occur.

5. Close towing vehicle pintle hitch and reinsert safety pin.

6. Move tow vehicle away from trailer.

END OF TASK

Install Ground Rod Assembly

The trailer is equipped with three-section grounding rod with drive stud and three bronze couplings. One 25 foot # 6 AWG ground wire is provided for grounding trailer to ground rod assembly.

WARNING

Improper or no equipment grounding can result in serious electrical shock or death. Refer to “Earth Grounding and Bonding Pamphlet”, CECOM TR-98-6, Oct 1998 for more detailed information on grounding equipment.

Wear eye protection and gloves when hammering stakes and ground rod sections. Failure to observe this warning may result in injury to the eye or exposed skin from flying metal fragments.

1. Remove grounding rods from trailer bed (located on trailer bed between ECU and Genset).

2. Remove sledge hammer from stake set transport bag (WP 0009, Figure 1, Item 4).

NOTE

Refer to TM 11-5820-1118-12&P for appropriate grounding.

The best position for the grounding rod assembly is by the front roadside of the trailer where the bubble level is located.

In rocky areas where the grounding rod cannot be driven into the ground, dig a six inch trench and lay the grounding rod on its side.

In very dry conditions, keep the ground wet where the grounding rod is located.

3. Attach threaded collar to first section of grounding rod. Using sledge hammer, drive first section of grounding rod into earth until top of rod is just above surface of hole. Use threaded collar to attach and drive in the two remaining grounding rods.

4. Connect ground wire to grounding rod assembly with threaded to collar and bolt.

Install Ground Rod Assembly – Continued

5. Connect ground wire to trailer ground stud (GROUND CONNECTION), located on roadside under ECU. Secure using washer and wing nut.

END OF TASK

SHELTER SETUP

Off-loading Shelter

WARNING

Tent weights 633 lb (287.12 kg). This procedure requires four personnel and a team leader (spotter) to off-load the shelter package from the trailer cargo bay. Excessive strain on individual personnel could lead to bodily injury.

1. Remove stake set transport bag (WP 0009, On-Vehicle Equipment Loading Plan, Figure 2, Item 4) from the cargo bay and place in a common location out of the immediate shelter setup area.

2. Unbuckle six cargo net clasps (Figure 6, Item 1) and drop cargo net to the ground.

3. Loosen six cargo bay tarp tie down straps, remove cargo bay tarp and place out of immediate work area.

4. Remove four retaining pins (Figure 6, Item 2) securing the cargo bay crossbar (Figure 6, Item 3). Remove the cargo bay crossbar (Figure 6, Item 3) and place away from immediate work area.

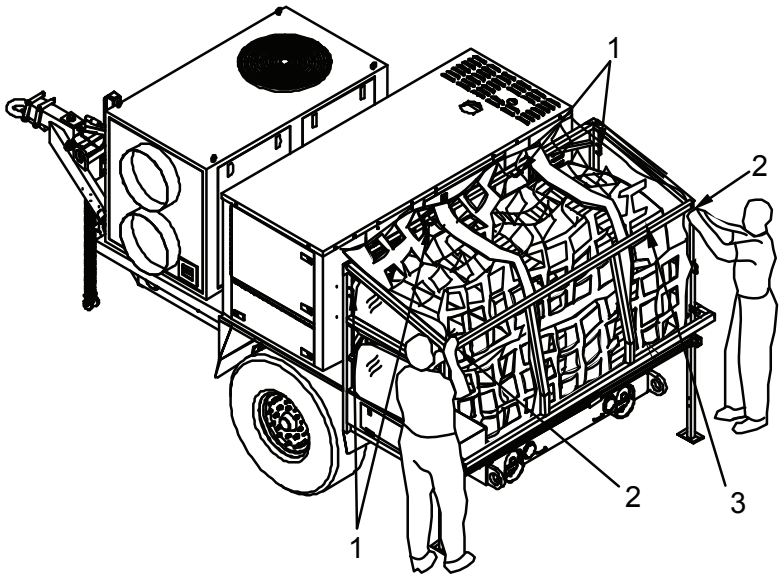


Figure 6. Remove the Crossbar.

5. Remove the electrical wiring kit transport bag (WP 0009, On-Vehicle Equipment Loading Plan, Figure 2, Item 3) from the cargo bay and place in a common location out of the immediate shelter setup area.

Off-loading Shelter – Continued

NOTE

Each transport bag containing an end cap is a two-person lift.

6. Remove two shelter end caps in transport bags (WP 0009, On-Vehicle Load Plan, Figure 2, Item 6 & 7) from cargo bay.

7. Place shelter end cap bags approximately 10 feet apart on either side of the center point where shelter will be raised (for a total of 20 feet between each shelter end cap bag) as shown in (Figure 7).

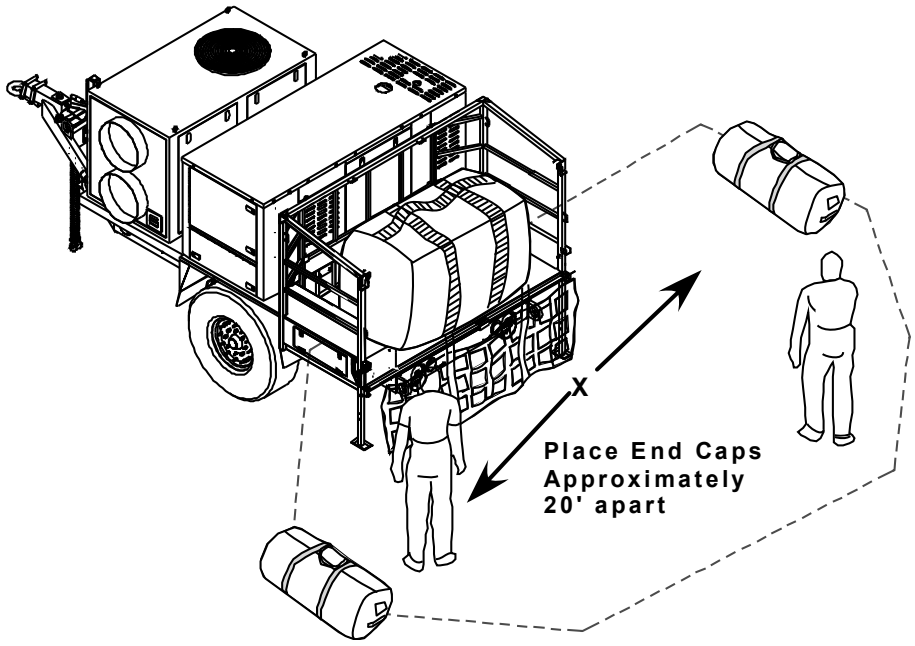


Figure 7. Remove and Position Shelter End Caps.

8. Position four team members around cargo bay end of trailer. Pull the shelter transport bag one half turn towards rear of trailer and then pull shelter transport bag to cargo bay edge.

WARNING

Tent weights 633 lb (287.12 kg). This procedure requires four personnel and a team leader (spotter) to off-load the shelter package from the trailer cargo bay. Excessive strain on individual personnel could lead to bodily injury.

9. Grasp cargo net with one hand and guide shelter transport bag into cargo net (cradled in the cargo net) with other hand. Use cargo net to aid in lowering shelter transport bag as shown in (Figure 8).

Offloading Shelter – Continued

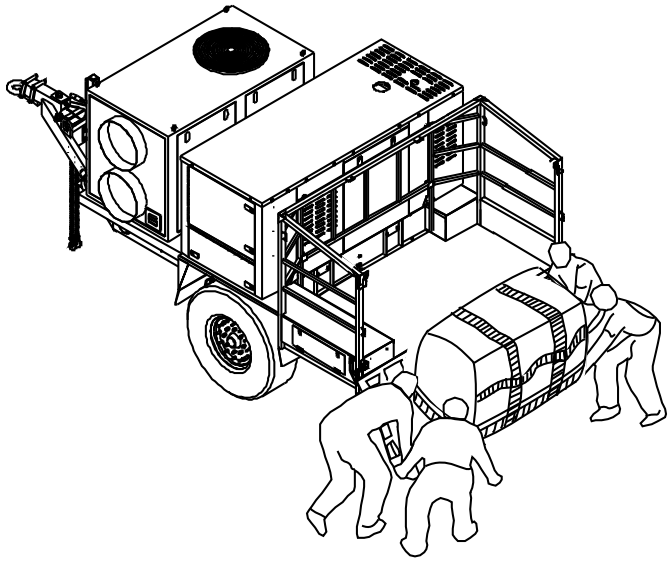


Figure 8. Lower Shelter Transport Bag to Ground.

10. Pull shelter transport bag across ground to center of intended setup site.

END OF TASK

Unpack Shelter

1. Stand shelter transport bag upright and remove shelter repair kit, push poles, and cinched shelter.
2. Unbuckle two outer cinch straps from cinched shelter and place in transport bag to prevent loss.
3. Unwrap floor from shelter bundle and remove floor from immediate area.
4. Stand shelter up so that exterior side (green or tan) is facing up and interior side (white) is facing down.
5. Orient shelter so that long side of shelter is facing end cap bags. Proper alignment will reduce the possibility of having to reposition shelter later.
6. Remove shelter cinch straps and place in transport bag to prevent loss.

END OF TASK

Expand and Lift Shelter

1. Position four personnel around shelter perimeter (Figure 9).
2. Locate outermost exterior lifting hubs (hubs with the coated steel wire loops).

CAUTION

When lifting hubs, lift from underneath where hub is connected to strut. Do not lift the shelter by the struts only. Do not lift by coated steel wire loops. The outermost exterior lifting hubs and the top of the struts are the only places from which shelter should be lifted.

Expand and Lift Shelter – Continued

3. Check that wind lines are not snagged on any hubs.

4. With both hands, grasp lifting hubs. On the Team Leader's command, lift shelter off ground, take two short steps backward, and put shelter down.

5. If any resistance is felt by any team member, immediately yell "STOP", identify restriction, and correct it (WP 0010, Crew Troubleshooting Index).

6. Continue to lift, step back, and expand shelter as shown in (Figure 9) until the shelter is at maximum spread (at maximum spread, the shelter will resist any further expansion).

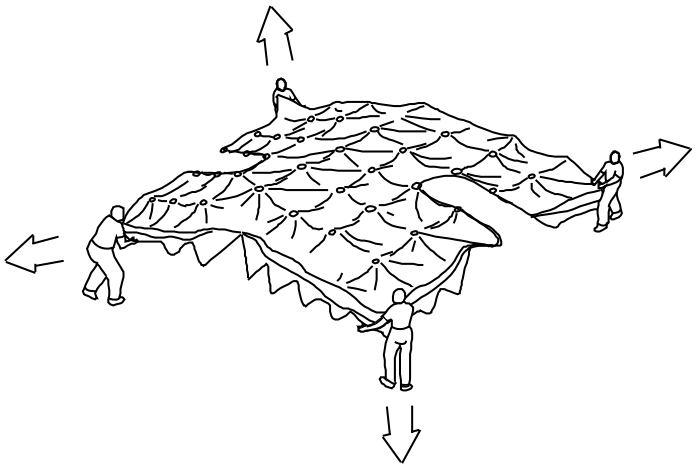


Figure 9. Expand and Lift Shelter.

NOTE

Lifting the shelter is performed in two stages: Lift to waist height and lift to full height.

7. Distribute four push poles to the crew.

8. Look under shelter cover and locate the four red flags (Figure 10, Item 1) on the interior cover (two red flags per side). There is one keeper associated with each red flag.

9. Each crew member place one hand on flagged keeper and hold push pole in other hand.

CAUTION

Never lift on a keeper that does not have a red flag. Failure to heed this caution could result in damage to the shelter.

10. On command, simultaneously lift shelter with one hand and place their respective push poles against keeper with the red flag.

11. As quickly as possible, lift until push poles will fit vertically between ground and keeper.

Expand and Lift Shelter – Continued

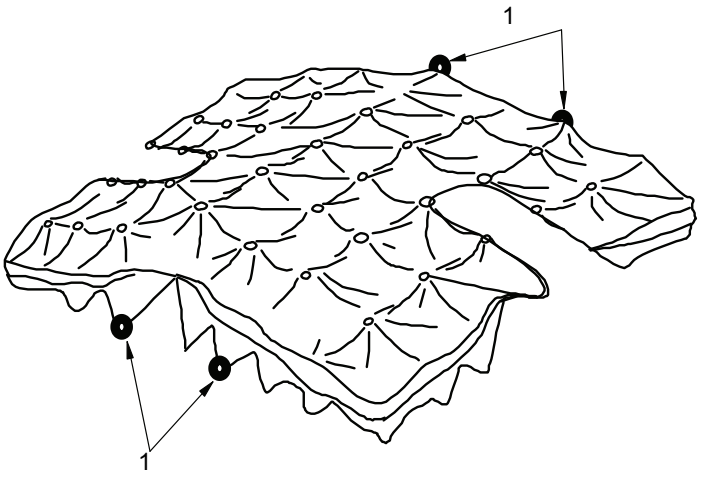


Figure 10. Red Flag Locations.

12. Slowly lower shelter until four push poles (Figure 11, Item 1) are supporting entire shelter as shown in (Figure 11).

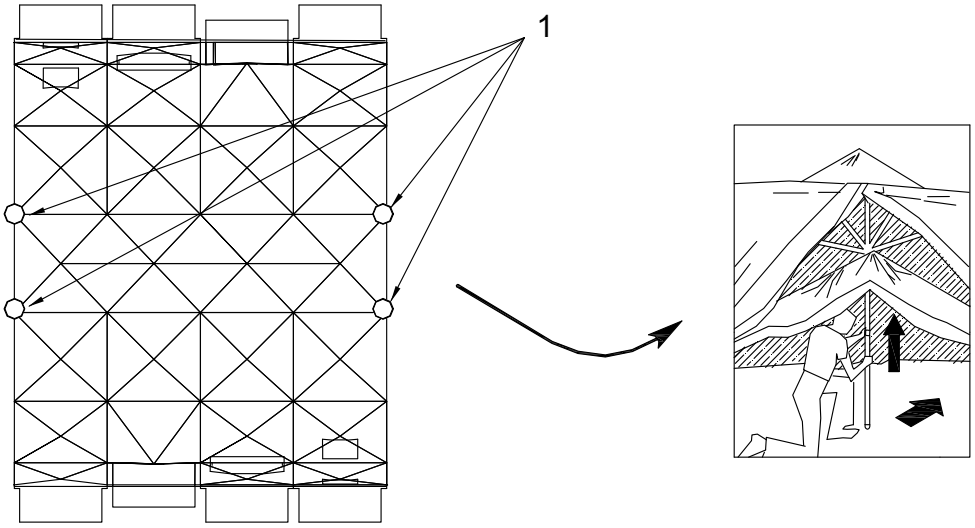


Figure 11. Shelter Resting on Four Push Poles.

WARNING

Two crew members are required to always hold the shelter when it is resting on the four push poles because it is not totally stable. The team leader must always monitor this operation and should immediately stop progress if there is any sideways motion of the shelter. Personal injury and damage to the shelter could result.

13. Identify additional four red flagged lifting keepers (Figure 12, Item 1) located approximately four feet inside shelter from outer flagged keepers.

Expand and Lift Shelter – Continued

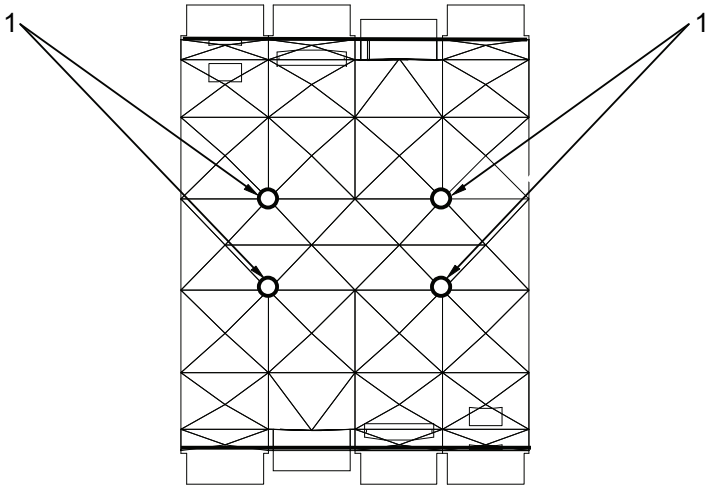


Figure 12. Position of Additional Red Flagged Keepers.

14. Instruct two diagonally opposed crew members to remove push poles and move inwards to red flagged lifting keepers and place push poles in a vertical position to support shelter. Remaining two crew members hold and steady shelter at this time.

15. Instruct remaining two crew members to advance push poles to inner red flagged lifting keepers. Initial two crew members hold and steady shelter at this time. The center section of the shelter is now at waist height resting on push poles.

END OF TASK

Attach End Caps

Before the shelter is raised to full height, the two end caps are attached to the center section as follows:

1. Remove both end caps from transport bags.

2. Remove cargo straps from end caps and stow in transport bags.

3. Expand end caps in same manner as shown in (Figure 9).

4. Orient each end cap so that red hubs are pointed towards mounting pins on center section frame.

5. Unroll two cover sides of each end cap.

6. Ensure end cap doors are unzipped.

7. Align both end caps (Figure 13, Item 1) to two open ends of the center section (Figure 13, Item 2).

Attach End Caps – Continued

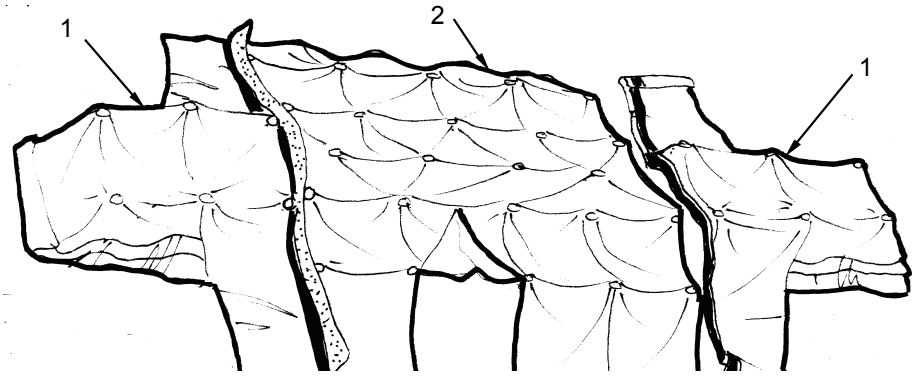


Figure 13. Position End Caps Next to Center Section.

8. Secure one end cap frame (Figure 14, Item 1) to one end of center section frame (Figure 14, Item 4) by lifting end cap and placing red end cap hubs (Figure 14, Item 2) onto pin protruding from the white colored hubs (Figure 14, Item 3) on the center section frame.

9. Insert pin (Figure 14, Item 5) to secure red hubs to white hubs.

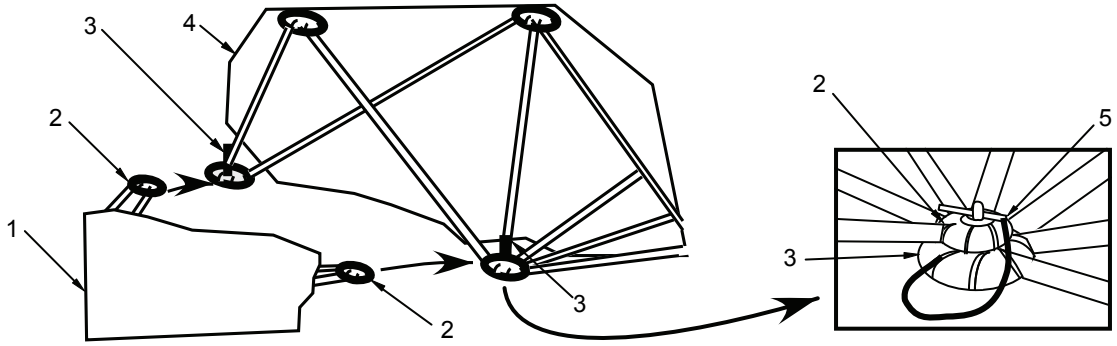


Figure 14. Secure End Cap Frame to Center Section Frame.

10. Locate black tabs sewn into centers of both ends of center section exterior cover (Figure 15, Item 2) and the center of both ends of end cap exterior cover (Figure 15, Item 1).

11. Beginning at black tab on end cap, join end cap exterior hook-and-loop seam to black tab on center section exterior hook-and-loop flap, working from center outwards to edge of upper end cap frame.

NOTE

If the hook-and-loop seam is fastened beyond the grommets, the shelter will not lift properly and internal struts could break.

12. Locate red tabs sewn into centers of both ends of center section interior cover and center of both ends of end cap interior cover.

13. Beginning at red tab on end cap, connect the hook-and-loop seam to the flap, working from the red tab outward to the grommet sewn in each side of center section hook-and-loop flap.

Attach End Caps – Continued

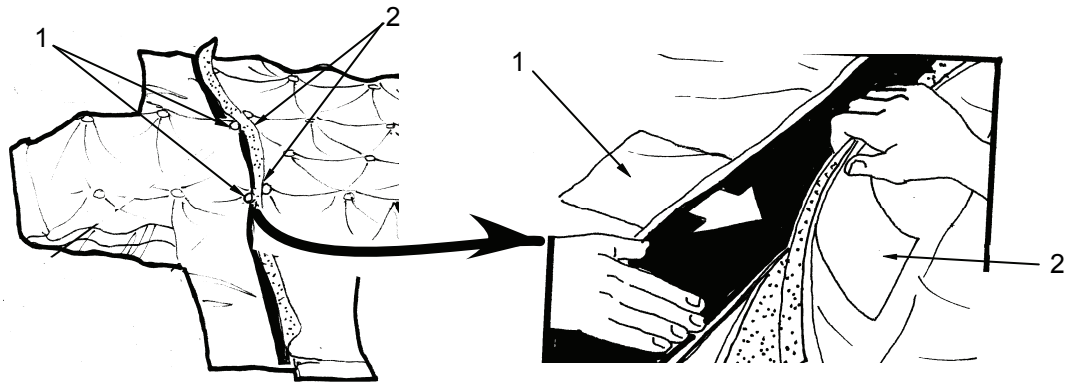


Figure 15. Secure End Cap Covers to Center Section Covers.

14. Attach hook-and-loop seam on end cap exterior cover down to grommet.

15. Ensure that all hook-and-loop seams are smooth in order to prevent leaks.

16. If not already opened, unzip the doors on end caps to allow access for push poles.

17. Repeat above steps for opposite end cap.

END OF TASK

Raise Shelter to Full Height

CAUTION

If setting up during high winds, position additional personnel along the windward side to hold wind lines while shelter is being raised.

Never lift on keepers that do not have red flags. Damage to frame could result.

Prior to final lift, all personnel should check that doors are not caught on any hubs or between struts. A snagged cover will prevent shelter from lifting to full height.

1. Lift each end cap off ground slightly and move in towards center section about one foot.

2. Return to push poles and grasp bottom of push pole to lift shelter to full height.

CAUTION

If any resistance is felt, stop immediately to prevent possible damage to the shelter.

3. On command, lift shelter until side walls come to a vertical position and shelter is self supporting.

4. Inspect hubs with staking plates attached at shelter bottom and make sure hubs are in a vertical position. If necessary, place foot against bottom hub and push into position.

5. Finish securing both end caps to center section by attaching hook-and-loop seam from grommet down to ground.

Raise Shelter to Full Height – Continued

6. The shelter should now be fully erect as shown in (Figure 16).

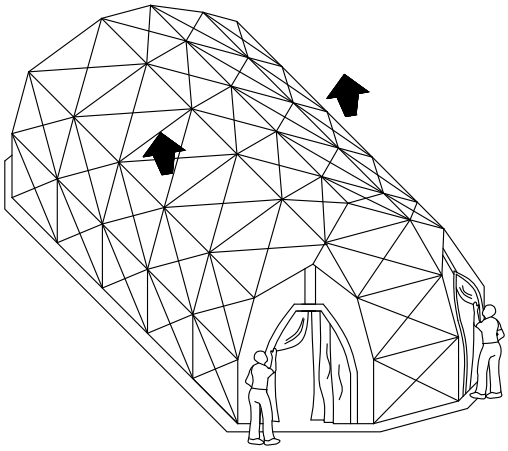


Figure 16. Shelter in Erected Position.

7. If shelter is in desired location, return push poles to shelter transport bag and proceed to “Install Floor" procedure. If shelter requires repositioning, perform the following paragraph, then proceed to “Install Floor” procedure.

END OF TASK

Reposition Shelter

The following two methods are used to reposition the shelter.

NOTE

Four people and a Team Leader (spotter) are required for either of these procedures.

Method 1 - Push Poles:

1. Place push poles against interior keepers with red flags (Figure 12, Item 1) and lift shelter off ground.
2. Move shelter so that it is positioned correctly.
3. Stop immediately if bottom of any wall drags on ground.
4. Return push poles to the transport bag.

Method 2 – Arms and hands:

1. For small adjustments, position personnel in doorways so that they are aligned with long wall.
2. Place one hand on exterior lifting hub (Figure 17, Item 1) and other hand on corresponding interior hub inside the doorway (Figure 17, Item 2).

Reposition Shelter – Continued

3. All four personnel should lift wall in unison and move shelter into correct position.

NOTE

Make sure that end or side walls do not angle inward beyond a vertical position.

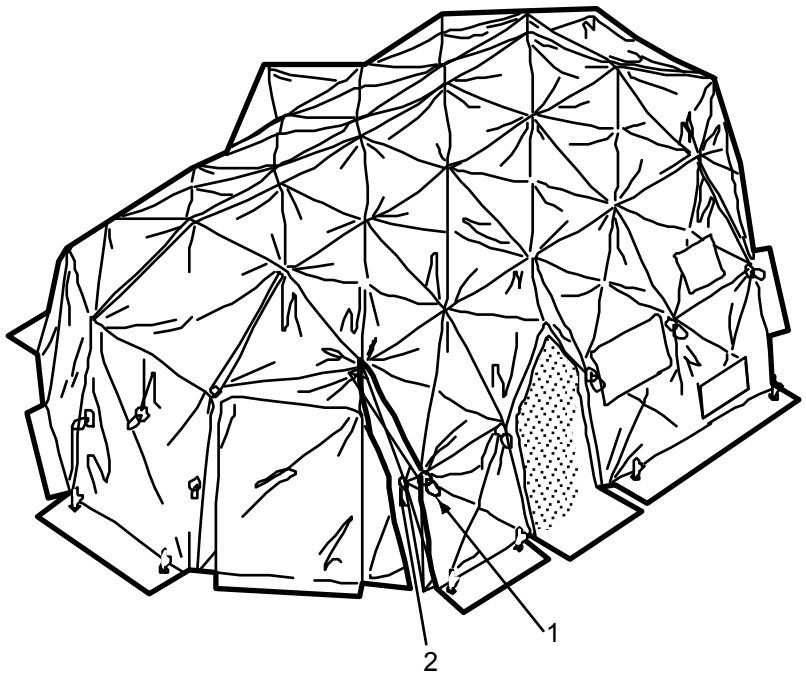


Figure 17. Shelter Lift Locations.

END OF TASK

Install Floor

1. Prepare to install shelter floor by ensuring that all inner flaps are pulled in and are laying flat with hook-and-loop fastener strip facing up.

2. Identify which shelter side door will be used as primary door.

3. Verify shelter center section staking plates are level (parallel) with ground. Place foot on staking plate and push down to level.

NOTE

When raising shelter in windy conditions, place additional stakes through staking plates on secondary door side of shelter.

4. Drive one stake through staking plate on each corner of center section on primary door side of shelter.

5. Place floor inside shelter by primary door and unfold floor.

6. Center door flap on floor to shelter side door.

Install Floor – Continued

7. Check fit of floor with respect to shelter.
8. Using two personnel start attaching floor to shelter center section on either side of door and work in opposite directions as shown in (Figure 18).
9. Complete joining floor to one side of shelter.
10. Pull floor tight towards inside of secondary door to remove any slack or bumps.
11. Join opposite section of floor to shelter to complete floor installation.

WARNING

Wear eye protection and gloves when hammering stakes and ground rod sections. Failure to observe this warning may result in injury to the eye or exposed skin from flying metal fragments.

12. Drive one stake through each staking plate in corners of secondary side of shelter.

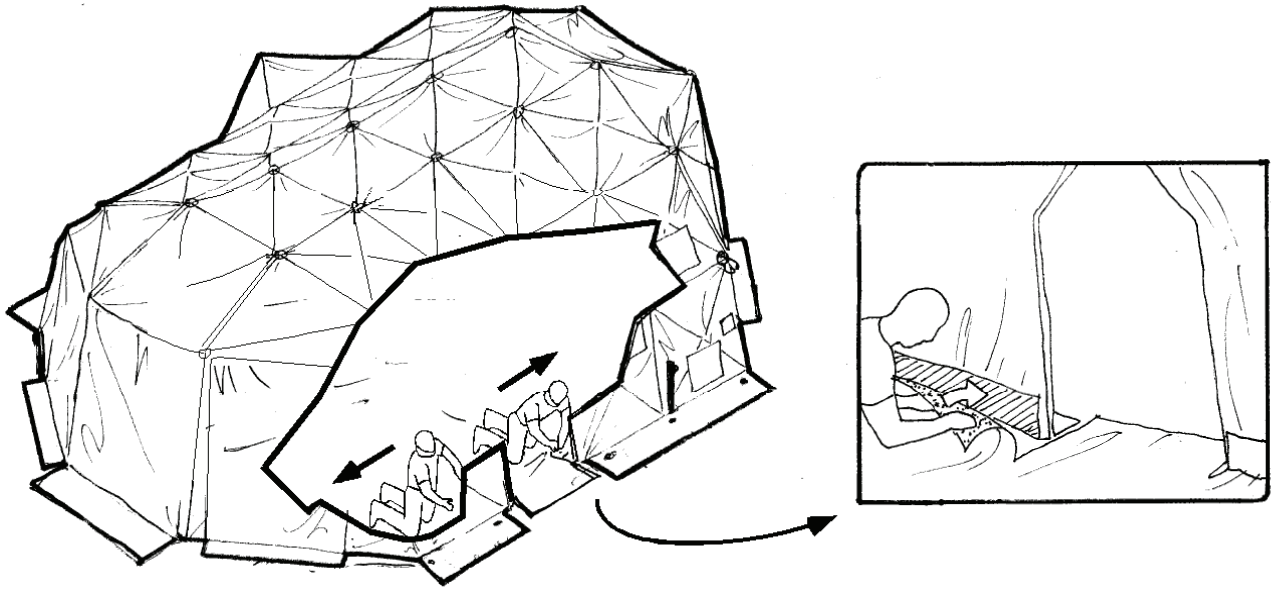


Figure 18. Attach Floor to Shelter.

END OF TASK

Secure Shelter

WARNING

All wind lines and ground stakes must be utilized, especially during inclement weather conditions. During adverse weather conditions, periodically check the wind lines and stakes. Failure to adequately secure shelter could result in personal injury and/or damage to shelter.

Wear eye protection and gloves when hammering stakes and ground rod sections. Failure to observe this warning may result in injury to the eye or exposed skin from flying metal fragments.

Secure Shelter – Continued

1. Drive stakes through remaining staking plates (Figure 19, Item 3) along both sides of shelter center section and into ground (Figure 19, Item 1) approximately four to five feet from shelter perimeter. Center stakes between the shelter wind line loops.

2. Fully unravel all wind lines (Figure 19, Items 2 and 4) and secure to ground stakes (Figure 19, Item 1). Secure multiple wind lines to each ground stake (Figure 19 for example).

3. Use cam-lock tensioner on wind lines to tighten each wind line.

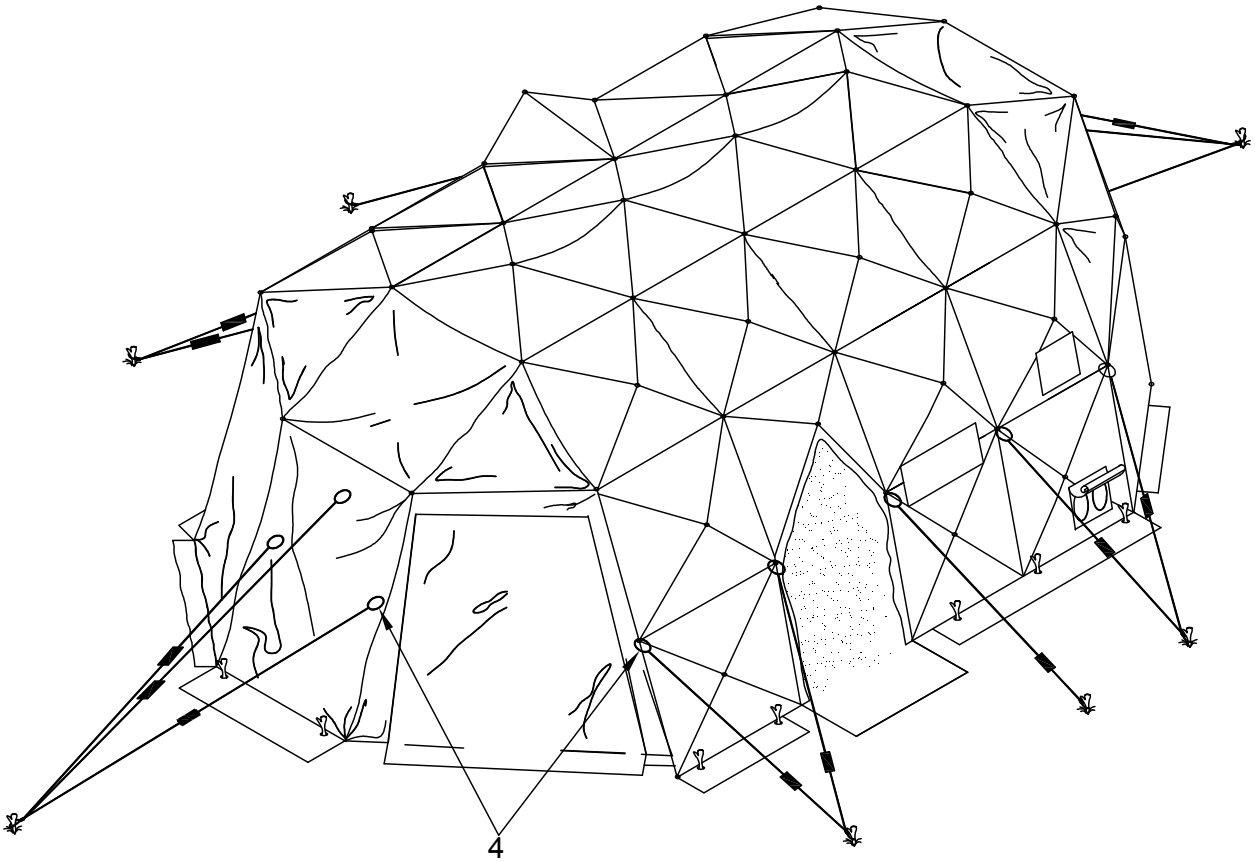


Figure 19. Shelter Installation Complete.

END OF TASK

Connect ECU Ducts to Shelter and Trailer

1. Remove two port caps (Figure 20, Items 1 and 2) from ECU.

2. Loosen belt securing ECU duct transport bags and shelter light set transport bags to trailer deck between ECU and Genset. Refer to (WP 0009) On-Vehicle Equipment Loading Plan for locations.

3. Remove two ECU duct transport bags from storage area and remove ducts from transport bags.

4. Return transport bags to trailer deck.

Connect ECU Ducts to Shelter and Trailer – Continued

5. Position belted end of each duct toward ECU ports.

6. Loosen belts on each duct.

NOTE

The input duct has a fine filter screen just inside duct opposite belted end. Screen end of duct goes inside shelter.

7. Attach air return duct (Figure 20, Item 3) to lower ECU port (Figure 20, Item 2) and tighten belt to secure in place.

8. Attach air supply duct (Figure 20, Item 4) to upper ECU port (Figure 20, Item 1) and tighten belt to secure in place.

9. To cool shelter, pull air supply duct (Figure 20, Item 4) through shelter supply port (Figure 20, Item 6). Pull air return duct (Figure 20, Item 3) through shelter return port (Figure 20, Item 5). Ensure there is approximately two feet of air supply duct (Figure 20, Item 4) and one foot of air return duct (Figure 20, Item 3) pulled into shelter at each port.

10. To heat shelters, pull air supply duct through lower shelter return port (Figure 20, Item 5). Pull air return duct (Figure 20, Item 3) through upper shelter supply port (Figure 20, Item 6). Ensure that there is approximately two feet of air supply duct and one foot of air return duct pulled into shelter at each port.

11. Secure ducts to shelter ports by tightening belts on shelter ports.

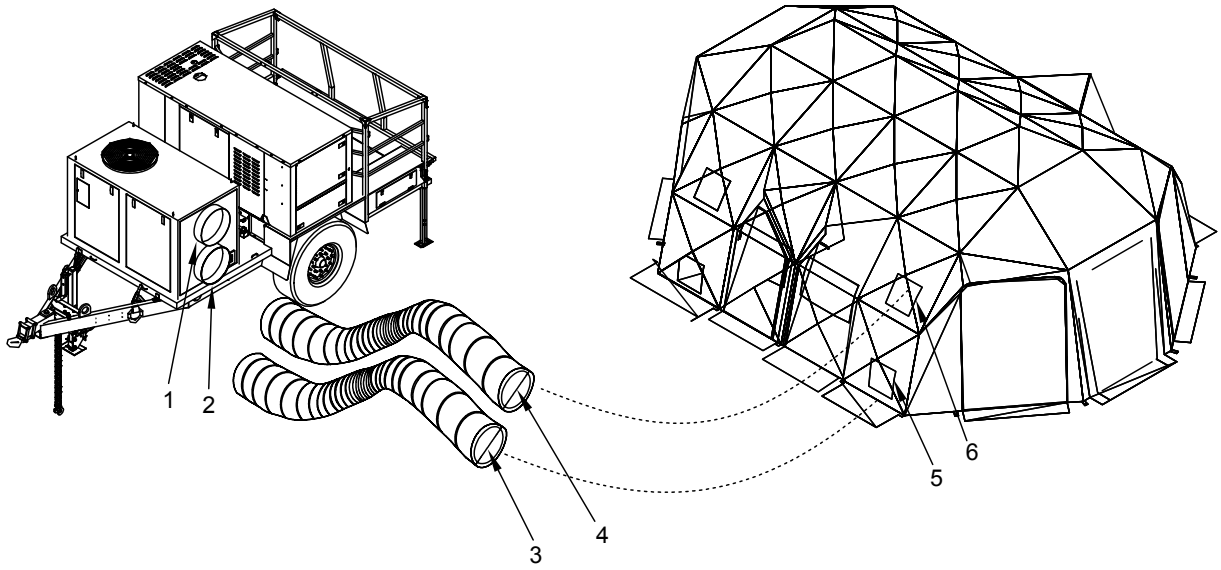


Figure 20. Connect Ducts to Shelter.

END OF TASK

CONNECTING CABLES AND EQUIPMENT

Install Power Cables from Genset to Shelter

The electrical wiring kit includes two 30 foot power cables to bring power from the Genset (through the J2 and J3 connectors on the Power Distribution Panel) to the shelter lights and/or other accessory items that may be used in the shelter. Refer to Description and Use of Operator Controls, Indicators, and Connectors (WP 0004), if necessary.

1. Remove power cables from electrical wiring kit transport bag.

2. Unscrew connector weather cover on power cable by turning cover counterclockwise to release and lift.

3. Using the guide slot, align power cable connector with J2 or J3 receptacle on Power Distribution Panel (Figure 21, Item 1) and twist clockwise to lock into place.

4. Run power cable(s) through cable sleeve (Figure 21, Item 2) located in shelter interior and exterior covers next to ECU ducts.

NOTE

The shelter floor has a cable runner built into it for use when cable is being run to opposite side of shelter.

5. Route cables through shelter so that cables do not interfere with movement of personnel through shelter.

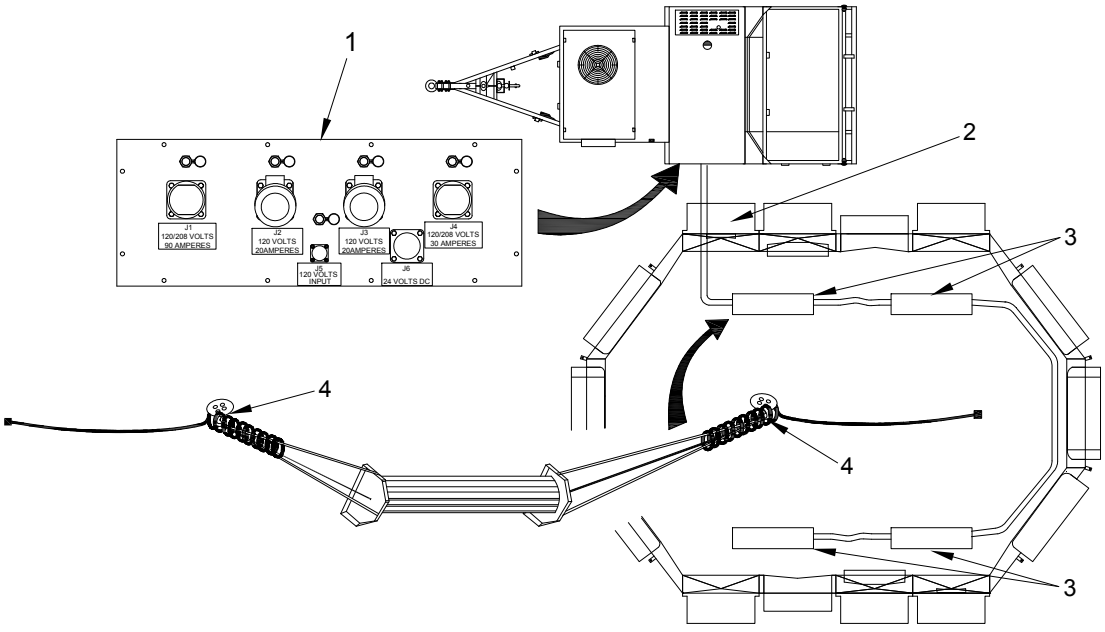


Figure 21. Typical Shelter Lighting Arrangement.

END OF TASK

Install Shelter Lighting

The TMSS-MED system includes two fluorescent light sets (one set consists of two lighting fixtures) for lighting the interior of the shelter. The fluorescent lighting fixtures are intended to be daisy-chained together so that one power cable can be used for lighting the shelter.

NOTE

Each shelter lighting fixture comes with two strap-mounted clip connectors (one on each side) to provide flexibility in mounting.

1. Arrange four shelter lighting fixtures on shelter floor (Figure 21, Item 3).
2. Starting with lighting fixture closest to power cable from Genset, connect male connector of first lighting fixture to female connector of power cable.
3. Connect female connector of same lighting fixture to male connector of second lighting fixture.
4. Connect remaining lighting fixtures to each other working in a circular motion around the shelter.

NOTE

Use two looped keepers located on third level of shelter interior. The outer keepers are located behind hook-and-loop strip connecting end caps to center shelter section. To access keepers, separate hook-and-loop strip in-line with 3rd row of keepers.

5. Lift first lighting fixture and connect clip to the outer looped keeper (Figure 21, Item 4) closest to power input cable.
6. Slide strap locks up or down the strap to level lighting fixture at desired height.
7. Lift second lighting fixture and stretch power cord from first lighting fixture to second lighting fixture.
8. Connect second lighting fixture clip connectors to looped keepers at far end of shelter.
9. Repeat procedure above for the remaining two lighting fixtures.
10. Run mounting straps through loops and hook back to lighting fixture so that light faces the wall.

END OF TASK

Install Power Distribution Unit (PDU)

The TMSS-MED system includes one Power Distribution Unit (PDU) to route electric power from either the Genset or a remote power source. PDUs provide a method of distributing power to branch circuits, utility extension cords, and lighting fixtures in the shelter. The PDU utilizes standard military 60 A power cable connectors.

NOTE

When operating in HEAT mode, the ECU will draw approximately 18 kW of power. This only leaves spare power to run the lights or small additional items. When operating in COOL mode the ECU will draw approximately 10 kW of power for lights and additional electric devices.

Install Power Distribution Unit (PDU) – Continued

1. Position PDU (Figure 22, Item 1) in close proximity between trailer (Figure 22, Item 4) and shelter (Figure 22, Item 2).

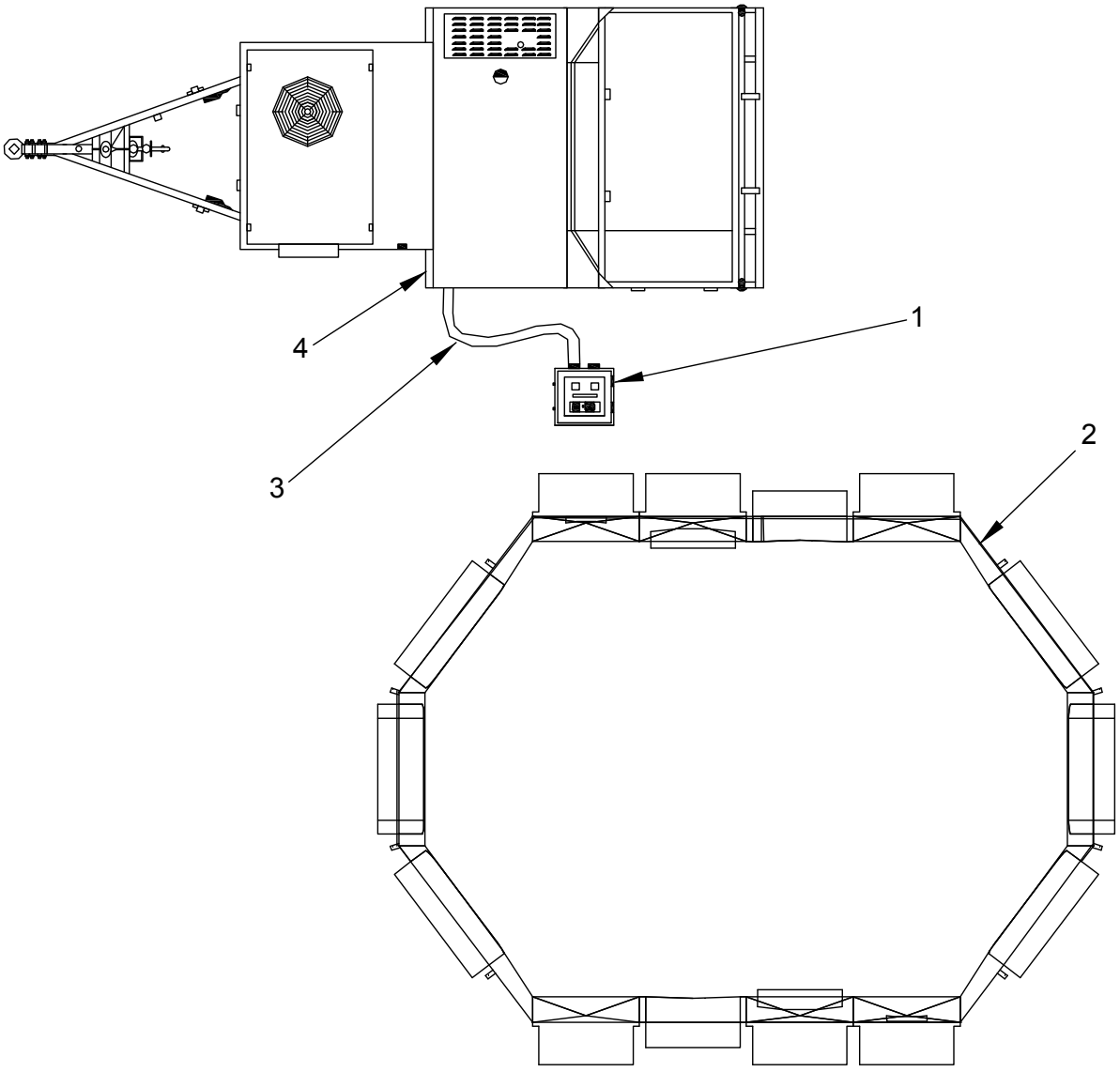


Figure 22. Location of PDU with Respect to Trailer and Shelter.

2. Connect 25 foot, 60 A power cable (Figure 22, Item 3) to J4 (30 A) connector on Power Distribution Panel.

3. Connect 25 foot, 60 A power cable (Figure 22, Item 3) to input connector J1 on PDU.

END OF TASK

Connect Equipment to PDU

NOTE

The PDU connectors are standard single phase, grounded 3-prong connectors. The PDU has one 30 A connector and five 20 A connectors.

Two circuit breakers, on the PDU, draw power from each phase of the Genset output. For proper load leveling, power draw should be distributed between each phase evenly. Failure to level the power draw can result in the Genset circuit breakers identifying an overload when there is not one present.

1. Lift hinged weather shield to one of four PDU output connectors, and connect male end of power cord into PDU connector.
2. Allow weather shield to lower back into place.
3. Run attached power cords through cable sleeve located in shelter exterior and interior covers next to ECU ducts.
4. Connect cables to the intended equipment.

END OF TASK

GENERATOR FUELING

Fueling Genset from Fuel Control Panel

Check the fuel level in the trailer fuel tank by viewing the mechanical fuel level indicator (Figure 23, Item 3) located behind a hinged access door between the ECU and the Generator.

WARNING

Diesel fuel is flammable. Do not fill fuel tank with engine running, while smoking, or when near an open flame. Never overfill tank or spill fuel. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death.

Add fuel as follows, if needed:

1. Check fuel level by opening fuel sight door (Figure 23, Item 3).
2. Remove fuel cap (Figure 23, Item 1) located on Fuel Control Panel (Figure 23, Item 2). A plastic funnel is provided and found in storage compartment.
3. Fill fuel tank with fuel.
4. Re-install fuel cap on filler mouth.
5. Recheck fuel level.

Fueling Genset from Fuel Control Panel – Continued

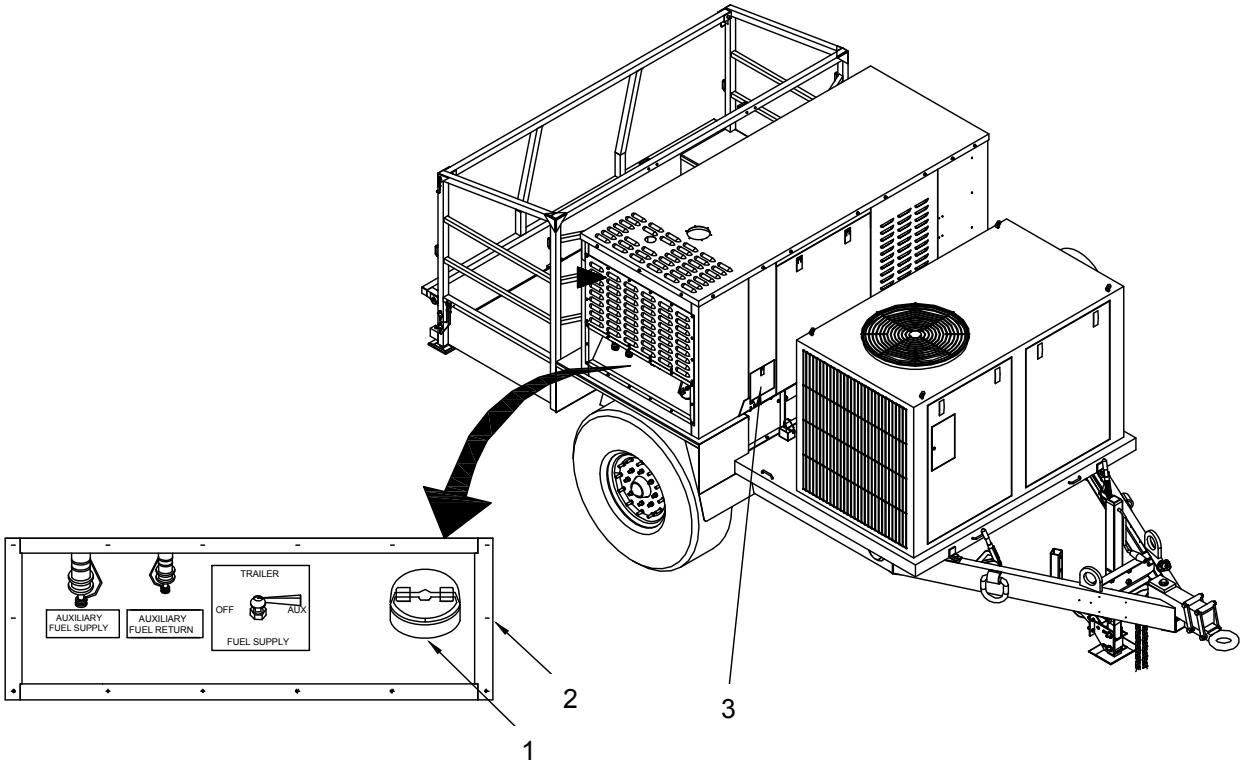


Figure 23. Location of Fuel Control Panel.

END OF TASK

Fueling Genset from Auxiliary Fuel Source

TMSS-MED trailer comes with one auxiliary fuel return line (Figure 24, Item 1) and one auxiliary fuel supply line (Figure 24, Item 3). The auxiliary fuel supply line has a bulb primer (Figure 24, Item 4) to start fuel moving from the external source.

1. Insert end of auxiliary fuel supply line (Figure 24, Item 3) closest to bulb into auxiliary fuel source (Figure 24, Item 2). Connect opposite end to AUXILIARY FUEL SUPPLY connector (Figure 24, Item 6).

2. Insert end of auxiliary fuel return line (Figure 24, Item 1) into auxiliary fuel source (Figure 24, Item 2). Connect opposite end to AUXILIARY FUEL RETURN connector (Figure 24, Item 5).

3. Turn FUEL SUPPLY switch to AUX position.

4. Prime bulb (Figure 24, Item 4) on auxiliary fuel supply line (Figure 24, Item 3) until resistance is felt. Check for any leaks.

Fueling Genset from Auxiliary Fuel Source – Continued

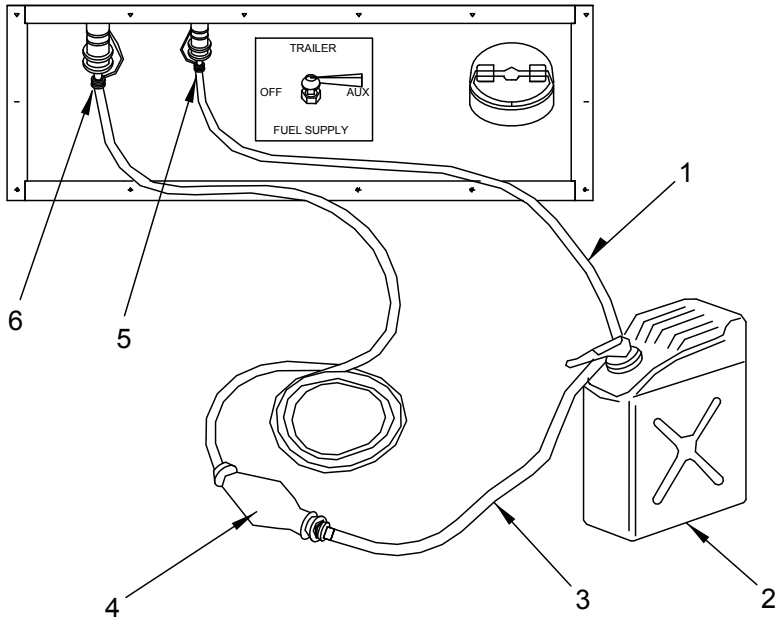


Figure 24. Aux Fuel Lines to External Fuel Supply.

END OF TASK

SYSTEM POWER-UP PROCEDURES

WARNING

There should be a 3-ft. stand-off when Genset is in operational status. Failure to comply may result in hearing loss.

Genset Start Procedure

1. Place BATTERY SWITCH on Circuit Breaker Panel to ON position.

NOTE

If engine is cold, (i.e., has not been operated within the last 2 to 3 hours), continue with Step 2.

If engine is warm, proceed to Step 3.

If operating in Arctic conditions, (i.e., ambient temperatures are 0°F or below), refer to Operation Under Unusual Conditions (WP 0006).

2. Place ENGINE selector switch on Genset Control Panel to PREHEAT position for approx 10 to 20 seconds.

3. Turn and hold ENGINE selector switch in the START position until engine starts. After engine starts, release ENGINE selector switch and it will spring-return to the RUN position.

Genset Start Procedure – Continued

4. Immediately after starting the engine:

   - Check lubrication oil pressure at OIL PRESSURE gauge on Genset Control Panel. The minimum oil pressure is 20 psi (normal oil pressure is 20 to 55 psi). If oil pressure does not rise promptly to over 20 psi, stop engine by turning ENGINE selector switch to OFF and contact service maintenance.

   - Check to see if leaks are evident, both inside and under enclosure. If leaks are present, turn engine off and call service maintenance.

5. Turn VOLT/AMP select switch from OFF to L1-L2 position. Read VOLTS meter. It should read 208 VAC. If not, fine-tune voltage to 208 VAC using VOLTAGE ADJUST potentiometer on Genset Control panel. With voltage set, verify that HERTZ frequency meter is reading between 60-61 Hz.

6. Turn VOLT/AMP select switch to L2-L3 position and check that AC VOLTS meter and HERTZ frequency meter readings are the same as for L1-L2. Do the same for L3/L1 position. If Genset does not deliver desired voltage and frequency or if there is a marked difference among the three legs, do not operate Genset. Contact service maintenance.

7. Move circuit breaker CB5 (GEN) on Circuit Breaker Panel to ON position. Power is now available from generator.

END OF TASK

Applying Power from Genset

1. To make power available at the J2 and J3 receptacles turn ON circuit breakers CB2 and CB3. When power is available at a receptacle, the indicator light above that receptacle will illuminate.

WARNING

Verify that circuit breaker CB1 is off before connecting ECU power cord to Power Distribution Panel. Serious injury or death could occur.

2. Connect power cable from ECU to receptacle J1 on Power Distribution Panel. Power is made available to ECU through receptacle J1 which in turn is protected by circuit breaker CB1.

3. Periodically check all meter readings on Genset Control Panel.

END OF TASK

ECU Start Procedure

NOTE

Ensure airflow to and from the ECU is unobstructed. This includes the fan on top and louvers on the sides.

1. Ensure ECU power cable is connected to power source.

2. If using Genset power, turn CB1 on Circuit Breaker Panel to ON position. If using shore power, apply shore power.

ECU Start Procedure – Continued

CAUTION

Do not run ECU with red OUT OF PHASE light on. Damage to motor can result.

3. Ensure green POWER ON indicator light on ECU Control Panel is lit.

4. Verify that red OUT OF PHASE indicator light on ECU Control Panel is not lit. If lit, conduct Out of Phase troubleshooting procedures (WP 0011 and WP 0030).

CAUTION

Do not set thermostat below 50 degrees in cool mode and not above 90 degrees in heat mode. Setting thermostat outside this range can cause the ECU to malfunction.

Do not adjust the thermostat frequently. Select a temperature and leave it. Frequent adjustment can cause premature failure of the thermostat.

5. Set TEMPERATURE dial to the desired temperature required to maintain a comfortable interior shelter temperature.

NOTE

Keep all shelter doors and windows, exterior and interior, closed as much as possible to maintain dead air space between the exterior and interior covers. Use camouflage netting or other shading means to reduce solar energy absorbed by the shelter.

6. Turn ECU MODE SELECT switch to appropriate position. Modes of operation are:

   – OFF, no ECU operation.
   – FAN, circulating fan only operation.
   – COOL, provides cool air and fan operation, utilizes 10 kW of Genset power during cooling operations.
   – HEAT LOW 9 kW, utilizes 9 kW of Genset power during heating operations. The remaining power may be used to power ancillary devices.
   – HEAT HIGH 18 kW, utilizes 18 kW of Genset power during heating operations. The minimal remaining power may be used to power only a few ancillary devices.

END OF TASK

PDU Start Procedure

1. Turn CB4 on Genset Circuit Breaker Panel to the ON position.

2. Twist two locks on PDU cover, and raise cover to gain access to circuit breaker panel.

3. Set applicable circuit breakers on PDU to ON position. Yellow power lights located above each connector will illuminate to indicate connector is active (hot).

4. On PDU, turn VOLTMETER select switch to L1, L2, and L3 positions, each time checking reading on A-C VOLTS meter on PDU. Verify that distribution is balanced.

5. Close PDU cover and secure 2 locks.

END OF TASK

Checking PDU Power Draw

1. On Genset Control Panel, turn the VOLT/AMP select switch to the L1/L2 position.
2. Note amperage draw shown on A-C AMPERES meter on Genset Control Panel.
3. Switch VOLT/AMP select switch to L2/L3 and L3/L1 positions and note amperage draw on A-C AMPERES meter on Genset Control Panel.
4. Compare Amperage draw on each leg. Adjust equipment to even out power draw across all legs.

END OF TASK

SYSTEM POWER-DOWN

PDU Shut-Down Procedure

CAUTION

Prior to shutting down PDU, ensure all ancillary equipment being powered by PDU has been properly shut down in accordance with shut down procedures for each individual piece. Equipment may become damaged or critical data may be lost if proper procedures have not been followed.

Prior to powering down PDU, ensure all tasks inside of the shelter have been performed. Internal lighting will be lost if powered by the PDU.

1. Shut down all equipment being powered by the PDU.
2. Set all circuit breakers on PDU to the OFF position. Yellow power lights located above each active connector will go out indicating power no longer present at connector.
3. Set CB4 on Genset Circuit Breaker Panel to OFF position.

END OF TASK

ECU Shut-Down Procedure

1. Turn ECU MODE SELECT switch on the ECU Control Panel to OFF position.
2. Turn CB1 on Genset Circuit Breaker Panel to OFF position. If using shore power, turn OFF.
3. Disconnect ECU power cable from power source (J1 on Power Distribution Panel or shore power).
4. Stow ECU power cable on trailer bed between ECU enclosure and Genset enclosure.

END OF TASK

Genset Shut-Down Procedure

1. Verify that ECU and PDU have been shut down.
2. Set all circuit breakers on Circuit Breaker Panel to OFF position. There should be no load on generator.
3. On Genset Control Panel, turn VOLT/AMP select switch to OFF position.

Genset Shut-Down Procedure – Continued

CAUTION

Verify that all circuit breakers on Genset Circuit Breaker Panel are in the OFF position prior to stopping the engine.

4. On Genset Control Panel, turn ENGINE select switch OFF position.

5. On Genset Circuit Breaker Panel, turn BATTERY SWITCH to OFF position.

END OF TASK

DISCONNECTING CABLES AND EQUIPMENT

Disconnect Equipment from PDU

1. If Genset has not been completely shut down, ensure that appropriate circuit breaker on PDU has been set to OFF.

2. Disconnect all cables attached to P1 through P6 of PDU.

3. Properly gather all power cables and store with appropriate pieces of equipment or in proper storage location on TMSS-MED trailer.

4. Set PDU outside of shelter in preparation for loading onto trailer.

END OF TASK

Disconnecting Input Power to PDU

CAUTION

Prior to disconnecting cables, ensure PDU is shut down and that all ancillary equipment being powered by PDU has been properly shut down in accordance with shut down procedures for each individual piece. Equipment may become damaged or critical data may be lost if proper procedures have not been followed.

1. If Genset has not been completely shut down, ensure that CB4 on Genset Circuit Breaker Panel has been set to OFF position.

2. Disconnect the 25 foot, 60 A power cable from J1 of the PDU and from J4 (30 A) connector on the Power Distribution Panel. Roll up 25 foot, 60 A power cable and prepare for storage.

3. Set outside of shelter in preparation for loading onto trailer.

END OF TASK

Removal of Shelter Lighting

1. If Genset has not been completely shut down, ensure that appropriate circuit breaker has been set to OFF position.

2. Disconnect power cables that run from lighting fixture to lighting fixture and to power source.

Removal of Shelter Lighting – Continued

3. Loosen mounting straps and disconnect clips from keepers. Lower lighting fixtures one at a time. Repeat until all four lighting fixtures have been removed.

4. Store power cables and lighting fixtures in appropriate transport bag.

5. Set transport bag outside of shelter in preparation for loading onto trailer.

END OF TASK

Disconnect Power Cables from Genset to Shelter

1. If Genset has not been completely shut down, ensure that appropriate circuit breakers (CB2 and CB3) on Genset Circuit Breaker Panel are in the OFF position.

2. Remove power cables routed through shelter and cable sleeve located in shelter interior and exterior covers next to ECU ducts.

3. Disconnect power cable connector from J2 or J3 receptacle on Power Distribution Panel.

4. Install connector weather cover onto power cable by turning cover clockwise to tighten.

5. Roll up power cable(s) and store power cables in appropriate transport bag.

6. Set transport bags outside of shelter in preparation for loading onto trailer.

END OF TASK

Disconnect Grounding Rod Assembly

1. Remove wing nut and washer from trailer ground stud (GROUND CONNECTION) (located on roadside under ECU) and disconnect ground wire. Replace washer and wing nut onto trailer ground stud (GROUND CONNECTION).

2. Disconnect ground wire from grounding rod assembly. Coil up ground wire and set aside.

3. Loosen and remove grounding rod from earth ground. If necessary, disassemble grounding rod one section at a time by loosening and removing bronze couplings.

4. Disconnect threaded collar from first section of grounding rod.

5. Return ground wire, threaded collar and bronze couplings to storage.

6. Secure grounding rod sections to trailer bed (between ECU and Genset enclosures).

END OF TASK

SHELTER TEAR DOWN

Disconnect ECU Ducts from Shelter and Trailer

1. Loosen belts on each duct at ECU end.

2. Remove supply air duct from upper ECU port.

Disconnect ECU Ducts from Shelter and Trailer – Continued

3. Remove return air duct from lower ECU port.
4. Install two port caps on ECU ports and tighten belts.
5. Loosen belts on shelter supply and return ports to allow for removal of ducts.
6. Remove air ducts from supply and return ports of shelter.
7. Compress air ducts and return to transport bags.
8. Set transport bags outside of shelter in preparation for loading onto trailer.

END OF TASK

Floor Removal

1. Remove stakes securing staking plates in corners of secondary side of shelter.
2. Disconnect floor from shelter by starting on secondary side of shelter and detaching the hook-and-loop strip on floor from the hook-and-loop seam on shelter working in opposite directions to complete one side.
3. Detach the hook-and-loop strip on floor from the hook-and-loop seam on both end cap covers and faceplates.
4. Complete all remaining hook-and-loop strips on floor from the hook-and-loop seams on shelter.
5. Fold floor ends in and remove floor from shelter.
6. Fold floor into quarters lengthwise and remove floor from immediate work area.

END OF TASK

Shelter Preparation

1. Tie back two side doorways in the open position (Figure 25).
2. Close all interior and exterior windows.
3. Start at ground level and unfasten interior hook-and-loop connector strips on both sides of end caps.
4. Start at ground level and unfasten exterior hook-and-loop connector strips on both sides of end caps up to frame.

Figure 25. Tie Back Doorways.

Shelter Preparation – Continued

WARNING

Do not enter the shelter once the wind lines and ground stakes are removed. The shelter could collapse and cause serious injury.

5. Remove all wind lines and ground stakes and pack in transport bag.

END OF TASK

Lowering Shelter

1. Lift bottom of each end cap and pull backwards about one foot and place on ground to allow to collapse correctly.

2. Position four personnel in a square pattern around shelter perimeter. Proper position is indicated by four ground flaps marked with “TO STRIKE, LIFT HERE”.

3. Locate lifting hub under shelter exterior cover above ground flap.

WARNING

Grip shelter at hubs - never grip the struts (Figure 26). As struts fold in, hands and fingers can become pinched between struts.

4. At command of the team leader, lift shelter approximately six inches off ground and step backwards in one unified movement. The center of shelter will come down to ground level.

5. Complete detaching end cap hook-and-loop seams on both sides.

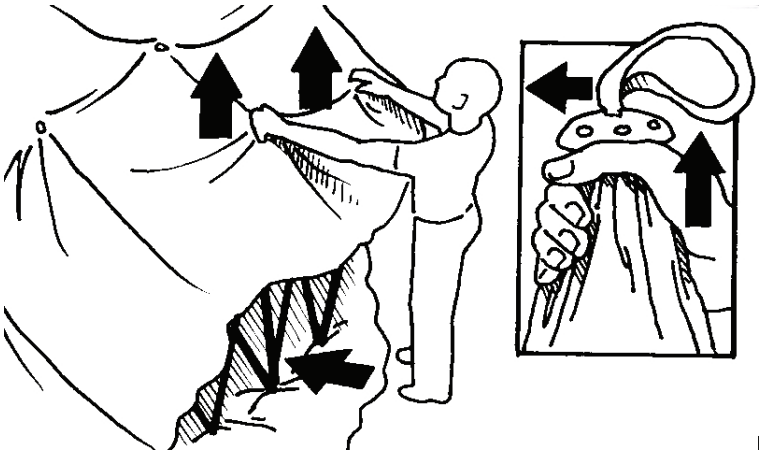


Figure 26. Grip Shelter by Hubs.

END OF TASK

SYSTEM PACKING AND LOADING

Packing End Caps

NOTE

Ensure that the end caps doors are unzipped.

1. Remove pin holding red hub to white hub and lift end cap clear of center of shelter.
2. Replace pin into pin stud.
3. Starting with exterior side, roll end cap door towards frame.
4. Flip end cap over so that the white side is up.
5. Roll interior end cap towards frame and secure to center hub with hook-and-loop strap.
6. Compress end cap by lifting upwards at hubs and walking towards each other.
7. Place one cinch strap around top of end cap and tighten.
8. Place second cinch strap around bottom of end cap and tighten.
9. Pull transport bag over upright end cap. Flip end cap bag over and close transport bag with drawstring.
10. Repeat same procedure for second end cap.
11. Place both bagged end caps out of immediate work area but near trailer.

END OF TASK

Packing Main Shelter

1. Position all hands under exterior cover on upper portion of strut.
2. Have all personnel lift upward in one motion and walk towards center of main shelter section.
3. Move inwards until main section is approximately 4/5 of way compressed.
4. Inspect compressed shelter section to make sure no wind lines are caught in any struts.
5. Compress shelter the rest of the way.
6. Retrieve four cinch straps from transport bag.
7. Place one cinch belt around top of compressed shelter and tighten. See (Figure 27).
8. Invert compressed shelter so that white side is facing up.
9. Push cover in between struts so that all interior looped keepers are exposed.
10. Push against shelter from all directions to compress further.
11. Cinch second strap around compressed shelter and tighten.
12. Invert shelter so exterior side (green or tan) is facing up.

Packing Main Shelter – Continued

13. Check and retighten cinch straps around compressed shelter as necessary.

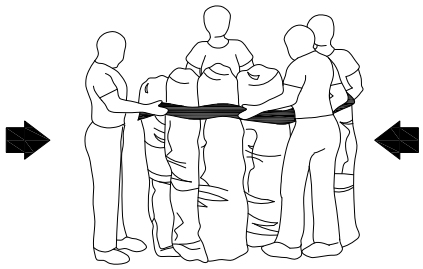


Figure 27. Secure First Cinch Strap.

14. Place shelter floor on a suitable flat surface.
15. Place buckle end of cinch strap under floor, about five inches in.
16. Lay shelter on one side and position at one end of folded floor.
17. Retighten cinch strap (on shelter) as necessary.
18. Roll shelter up into floor as shown in (Figure 28).

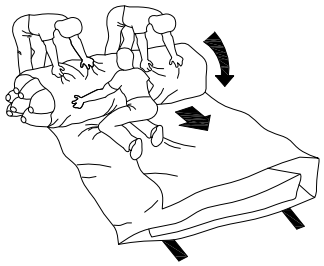


Figure 28. Roll Up Shelter with Floor.

19. Compress shelter as it is rolled up.
20. Secure cinch straps around floor and shelter.
21. Stand white side of shelter upright.
22. Remove push poles and repair kit from transport bag.
23. Place Transport Bag over shelter.
24. Push shelter over with the instruction panel (exterior section of transport bag) down.
25. Replace push poles and repair kit in transport bag.
26. Pull rope to close end of transport bag and secure bag with a knot.
27. Fasten two belts on the transport bag. The shelter is now secure and ready for loading onto trailer.

END OF TASK

Load Shelter onto Trailer

WARNING

Tent weighs 633 lbs (287.12 kg). This procedure requires four personnel to safely lift the shelter onto the trailer. Personnel injury may result from lifting excessive weight.

1. Unhook cargo net from trailer and remove superstructure cross bar.
2. Arrange cargo net to lay flat on ground, as shown in (Figure 29).
3. Roll shelter over onto cargo net.

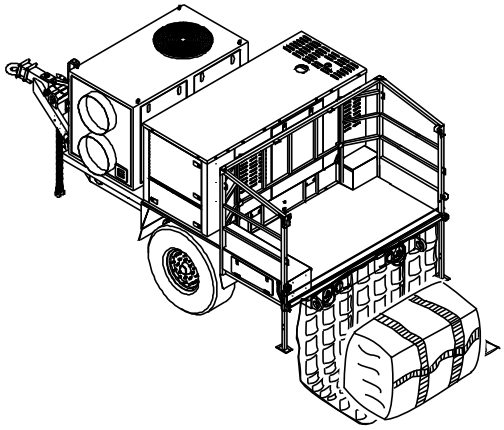


Figure 29. Ready for Assisted Lift of Shelter.

4. Have all personnel grasp cargo net with both hands and on team leaders command, lift transport bag by lifting up on cargo net, as shown in (Figure 30).

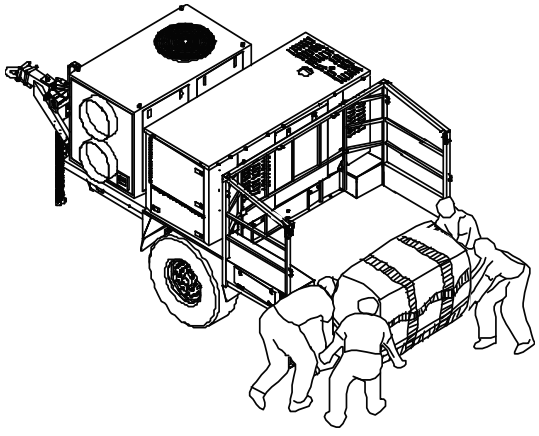


Figure 30. Lift Transport Bag.

5. Set bottom of transport bag on rear edge of the trailer's cargo bay and roll transport bag one-half turn onto trailer's cargo bay, as shown in (Figure 31).

Load Shelter onto Trailer – Continued

WARNING

Tent weighs 633 lbs (287.12 kg). This procedure requires four personnel to safely lift the shelter onto the trailer. Personnel injury may result from lifting excessive weight.

6. Push transport bag to front of cargo deck.

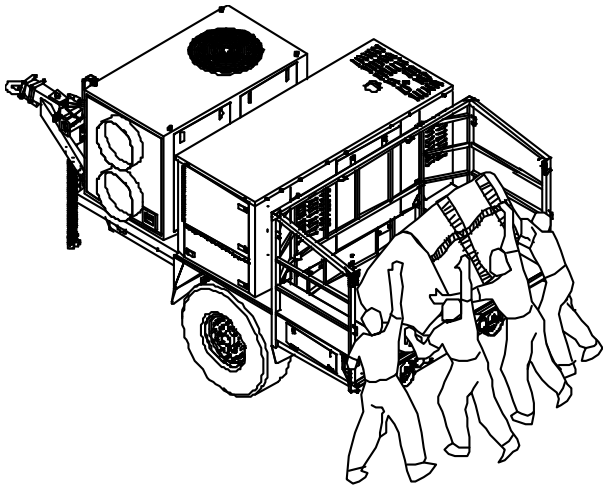


Figure 31. Push Transport Bag onto Trailer.

7. Place two end cap transport bags on top of main shelter transport bag.

8. Place remaining shelter components in respective positions on trailer, as shown in On-Vehicle Equipment Loading Plan (WP 0009).

9. Secure trailer crossbar to trailer using four retaining pins.

10. Secure cargo net to trailer crossbar with four cargo net clasps.

CAUTION

Leave the tarps off if trailer system is to be transported backwards on a train or truck.

11. Place tarp over trailer and secure to trailer with tie down straps.

END OF TASK

PREPARATION FOR MOVEMENT

There are two ways to transport the trailer: Shipping pertains to moving the trailer by truck, aircraft, railroad, or sea. Towing means that the trailer will be attached to a vehicle capable of pulling 4,200 lbs., both on and off road. Refer to Towing Instructions. The following paragraphs describe both methods.

Coupling the Trailer to a Tow Vehicle

WARNING

Power to the Genset batteries MUST BE turned off prior to moving the trailer. Failure to follow this warning may result in serious equipment damage and personnel injury.

1. Verify that all circuit breakers and switches are in the OFF position.

2. Verify that power to the batteries is off by ensuring the BATTERY SWITCH on the Circuit breaker Panel is in the OFF position.

WARNING

Ensure that towing vehicle and trailer are on level ground before coupling. Failure to follow this warning may result in serious personnel injury or equipment damage.

3. Apply both handbrakes (Figure 32, Item 1).

WARNING

Ensure weight of trailer is on tongue jack post (Figure 32, Item 3) before raising rear stabilizer legs. Failure to follow this warning may cause trailer to tip, resulting in serious injury to personnel or damage to equipment.

4. Fully retract and secure both rear stabilizer legs (Figure 32, Item 2).

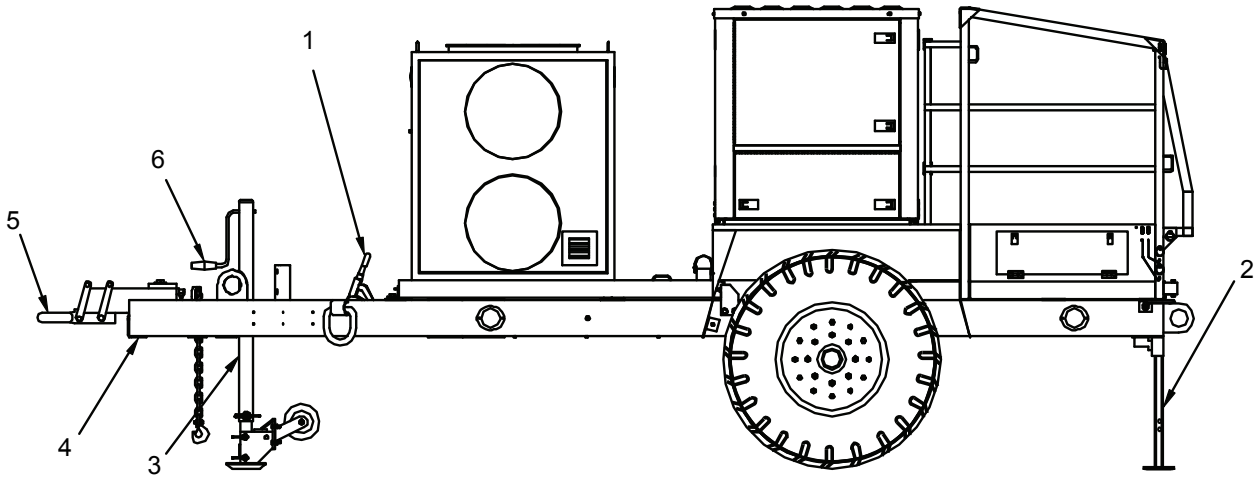


Figure 32. Trailer Leveled and Secured.

5. Rotate tongue jack hand crank (Figure 32, Item 6) to raise trailer tongue (Figure 32, Item 4) until lunette ring (Figure 32, Item 5) is higher than towing vehicle pintle hook (Figure 33, Item 8).

Coupling the Trailer to a Tow Vehicle – Continued

WARNING

When operating the tongue jack hand crank do not force the tongue jack beyond the normal operating range, or permanent damage may occur.

The trailer drawbar is heavy – up to 420 lbs (190.5 kg) loaded tongue weight. If the tongue jack is inoperative, remove load from trailer or use four or more persons to lift the drawbar. Failure to follow this warning may result in serious personnel injury or equipment damage.

6. Remove safety pin (Figure 33, Item 9) from pintle hitch (Figure 33, Item 2). Open pintle hitch (Figure 33, Item 2) by pulling up on locking latch (Figure 33, Item 1).

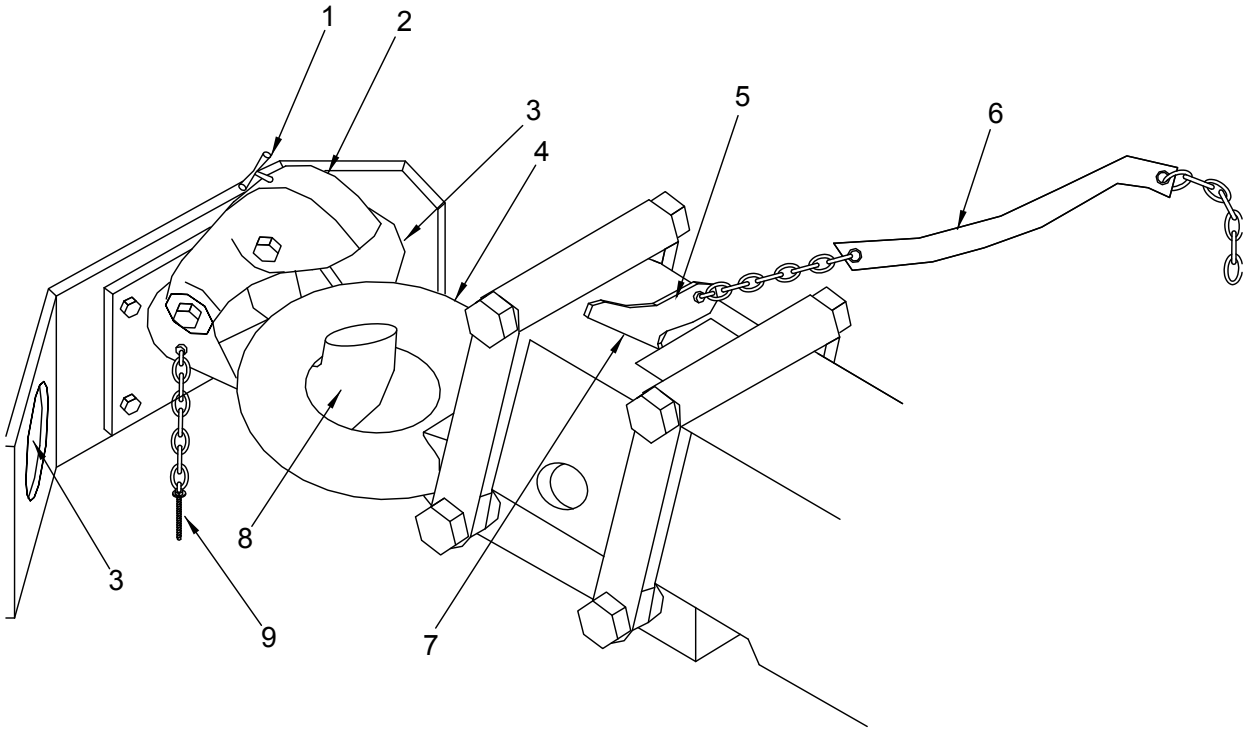


Figure 33. Attach Trailer to Tow Vehicle.

7. Back up towing vehicle in front of lunette ring (Figure 33, Item 4).

8. Adjust height of lunette ring (Figure 33, Item 4) by rotating tongue jack hand crank (Figure 32, Item 6).

9. Place lunette ring on towing vehicle pintle hook and close pintle hitch. Check that locking latch is locked by pulling up on pintle hitch. The pintle hitch should not come up.

10. Re-insert safety pin (Figure 33, Item 9) into pintle hitch (Figure 33, Item 2).

11. Cross two trailer safety chains under trailer tongue and hook to towing vehicle eyebolts. If safety chains are too long, they can be twisted to be shortened. It is recommended that wire be used across hook openings to prevent accidental unhooking.

Coupling the Trailer to a Tow Vehicle – Continued

CAUTION

Safety chains must be attached on opposite sides of the trailer tongue or frame and crossed under the tongue when passed forward to the towing vehicle so as to cradle the tongue in the event of a breakaway. Slack should only be sufficient to permit full turns.

Failure to provide enough slack can result in twisting the trailer tongue.

12. Attach safety breakaway cable (Figure 33, Item 6) to towing vehicle. Ensure there is enough slack in the cable to allow trailer to make full turns.

CAUTION

Ensure that breakaway lever is fully released. If the breakaway lever is not fully released, the brakes will drag, heat up, and burn out.

13. Ensure breakaway lever (Figure 33, Item 5) is pushed all the way back toward trailer and that breakaway lever is not engaged in leaf spring (Figure 33, Item 7).

14. Rotate tongue jack hand crank (Figure 34, Item 1) to raise wheel/skid plate assembly (Figure 34, Item 3) off the ground.

15. Remove two assembly pins (Figure 34, Item 4) holding wheel/skid plate assembly to tongue jack extension (Figure 34, Item 2).

16. Release extension pin (Figure 34, Item 5) and push tongue jack extension all the way up into tongue jack (Figure 34, Item 7). Secure tongue jack extension by reinserting pin in tongue jack.

17. Continue to rotate tongue jack crank to fully raise tongue jack.

18. Place wheel/skid plate assembly onto storage post (Figure 34, Item 6) with skid plate facing rear of the trailer.

19. Secure wheel/skid plate assembly to storage post by inserting two assembly pins.

20. Connect electrical plug on the inter-vehicular cable to receptacle of towing vehicle.

21. Check all towing vehicle and trailer lights for proper operation.

22. Release trailer handbrakes.

Coupling the Trailer to a Tow Vehicle – Continued

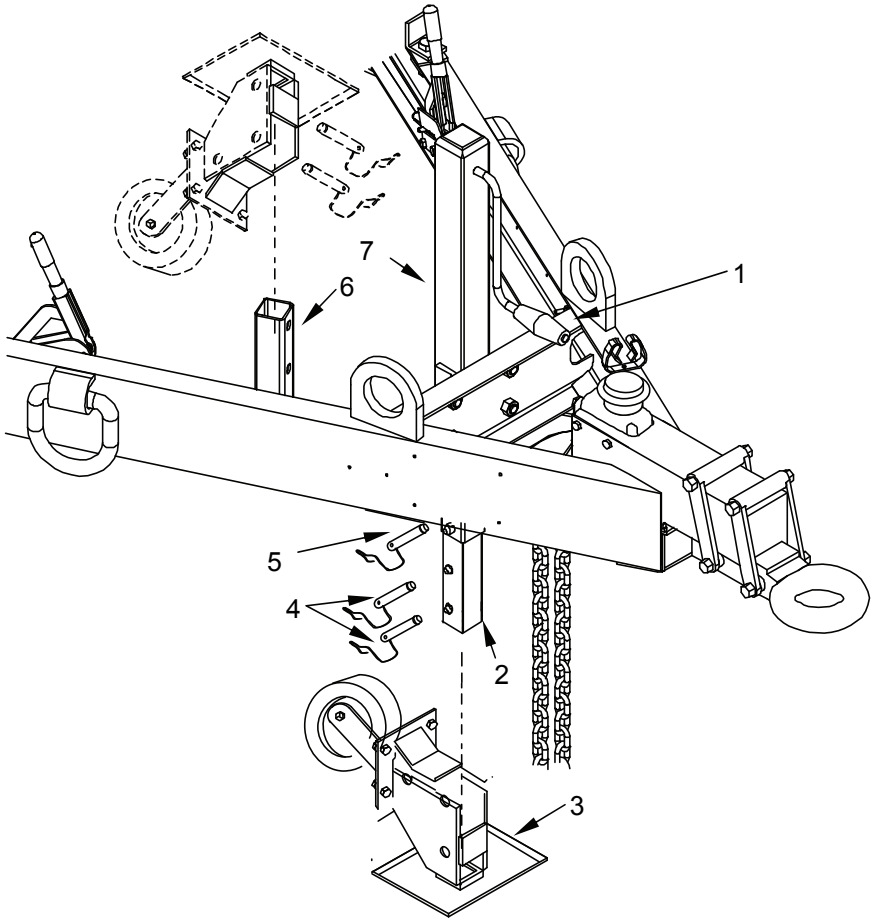


Figure 34. Secure Tongue Jack Assembly.

END OF TASK

Off-Road Driving Conditions

The TMSS-MED trailer is equipped with a safety brake actuator device that is intended to keep the safety brakes from engaging when the vehicle is operating off-road.

CAUTION

During extreme off road transport, tire pressure should be reduced to 17 psi. Failure to observe this warning could result in equipment damage.

NOTE

This procedure is to be used for all off-road operation of the TMSS-MED Trailer.

1. Ensure trailer lunette ring (Figure 35, Item 1) is level with towing vehicle.
2. Ensure safety chains (Figure 35, Item 4) are properly attached to towing vehicle.
3. Ensure safety breakaway cable (Figure 35, Item 2) is properly attached to towing vehicle.
4. Ensure rear stabilizer legs are properly stowed.
5. Ensure that trailer light cable is securely attached to the towing vehicle.
6. Ensure trailer tongue jack assembly (not shown) is properly stowed (failure to properly stow tongue jack assembly will result in damage to trailer tongue jack).
7. Ensure trailer handbrakes are disengaged.
8. Ensure all trailer cargo is secured.
9. Insert safety brake actuator lockout rod (Figure 35, Item 3) into the safety brake actuator lockout bore (Figure 35, Item 5), thus bypassing the trailer actuated braking system. (If trailer actuator is not pinned out, trailer actuated brakes may engage during extreme assents and descents, causing damage to the trailer tongue.)

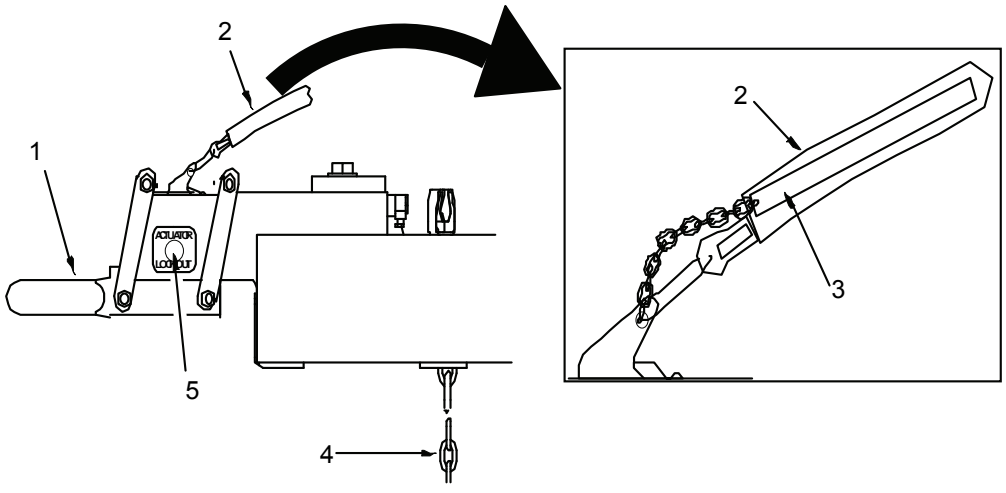


Figure 35. Trailer Safety Brake Lockout.

END OF TASK

Towing Instructions

NOTE

Refer to FM 21-305 for further information on proper towing practices.

Driving.

CAUTION

Sudden stops may cause drawbar to bend or buckle and may cause damage to hydraulic brake actuator assembly.

1. When the trailer is coupled, always start and stop the towed load slowly and gradually. Do this whether or not the trailer is loaded.

2. When driving a vehicle towing a trailer with a hydraulic brake actuator assembly, sudden and fast deceleration will cause the trailer hydraulic brakes to be applied.

3. Never exceed the maximum speed of 55 mph (88.5 km/h) highway or 20 mph (32.2 km/h) cross-country.

4. When driving the towing vehicle and trailer, the overall length of the unit must be kept in mind when turning and passing other vehicles. Because the unit is hinged in the middle, turning and backing are also affected. Heavier payloads will increase stopping distance and decrease off-road maneuverability.

END OF TASK

Turning.

CAUTION

Tight turns may cause damage to hydraulic brake actuator assembly.

1. When turning corners, allow for the fact that the trailer wheels may turn inside the turning radius of the towing vehicle.

2. To make a right turn at an intersection, drive the towing vehicle partway into the intersection, then cut sharply to the right. This will allow for the turning radius of the trailer to keep its wheels off the curb.

END OF TASK

Backing.

CAUTION

Always back the towing vehicle slowly and gradually.

1. Whenever possible, use an assistant driver or another person to act as a ground guide.

2. Adjust all towing vehicle rearview mirrors before backing.

3. When backing, the rear of the trailer will move in the opposite direction in which the towing vehicle is turned. When the towing vehicle is turned to the right, the rear of the trailer will go left. When the towing vehicle is turned and backing in a straight line is required, turn the towing vehicle in the direction the trailer is moving. This will slowly bring the towing vehicle and trailer into a straight line.

END OF TASK

Towing Instructions – Continued

Stopping.

CAUTION

Sudden stops may cause drawbar to bend or buckle and may cause damage to hydraulic brake actuator assembly.

Always stop the towing vehicle by applying brakes gradually and smoothly. Do this whether or not the trailer is loaded.

END OF TASK

Parking.

When the towing vehicle and the trailer are to be left unattended, set the trailer handbrakes, set the towing vehicle parking brakes, turn off the engine, and set wheel chocks.

END OF TASK

Preparation for Shipping

1. Chock (Figure 36, Item 2) wheels once the trailer is positioned upon the transport vehicle.
2. Use skid plate (not wheel) to support tongue jack (Figure 36, Item 4) during shipping. The skid plate resting on the deck surface will support the tongue jack. The trailer tongue jack must be fully retracted.
3. Apply two handbrakes (Figure 36, Item 1).

CAUTION

Avoid hitting the retracted tongue jack when loading and unloading the trailer or damage will occur to the tongue jack.

4. Secure trailer to transport deck using the two tie-down rings (Figure 36, Item 3).
5. When traveling, the axle/suspension allows the trailer to move in an up and down motion. If extra tarpaulins are used to cover the trailer, they should be tied only to the trailer and not to the transport deck.

Towing Instructions – Continued

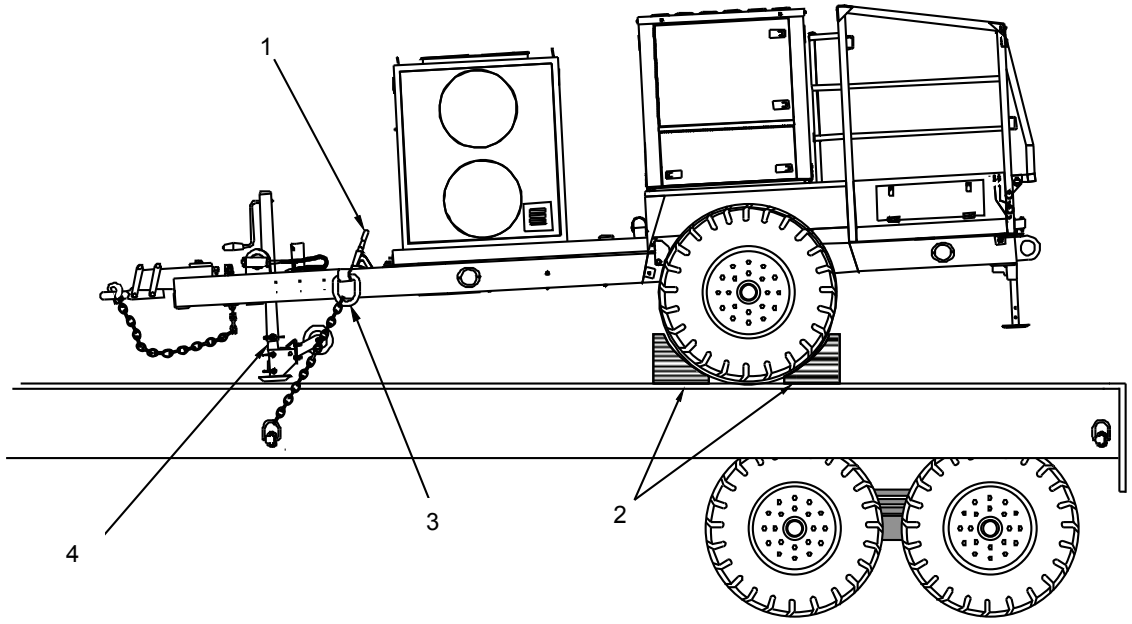


Figure 36. Trailer Properly Chocked and Positioned on Transport Trailer Deck.

END OF TASK

WEIGHT AND CENTER OF GRAVITY

The weight and Center of Gravity (CG) has been calculated using the fully loaded TMSS-MED trailer. This information is useful when moving the unit with a lifting device (crane, tow truck, etc.). It gives the operator an idea of how to adjust slings for balancing the unit and for placement onto transportation equipment.

NOTE

CG is based on TMSS-MED trailer being packed in accordance with On-Vehicle Equipment Loading Plan (WP 0009).

CG may vary slightly due to equipment movement during transport.

Refer to (Figure 37 and Table 1) for information on weights, CG, and overall measurements of shelter for lifting, loading, and transport of shelter.

Table 1. Weight of TMSS-MED Trailer.

ITEM	GROSS WEIGHT (LB)
TMSS-MED Trailer (less payload)	3,500 lb (1,588 kg)
Cargo	700 lb (1.737 kg)
Total gross weight (trailer and cargo)	4,200 lb (1905 kg)
Tongue (with cargo)	420 lb (191 kg)

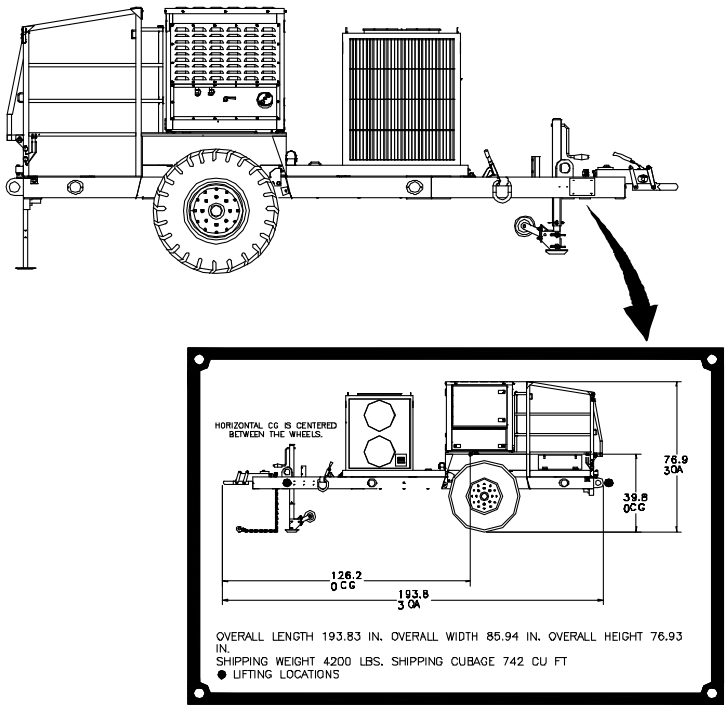


Figure 37. CG Tag Location on TMSS-MED Trailer.

WEIGHT AND CENTER OF GRAVITY – Continued

NOTE

Positive CG measurements for (Figure 38) begin from the curbside corner of the TMSS-MED trailer.

X - Begins at trailer pintle ring of the TMSS-MED trailer and moves toward the trailer center.

Y - Begins at widest part of the TMSS-MED trailer and moves toward the trailer center.

Z - Begins at lowest part of the TMSS-MED trailer and moves toward the trailer center.

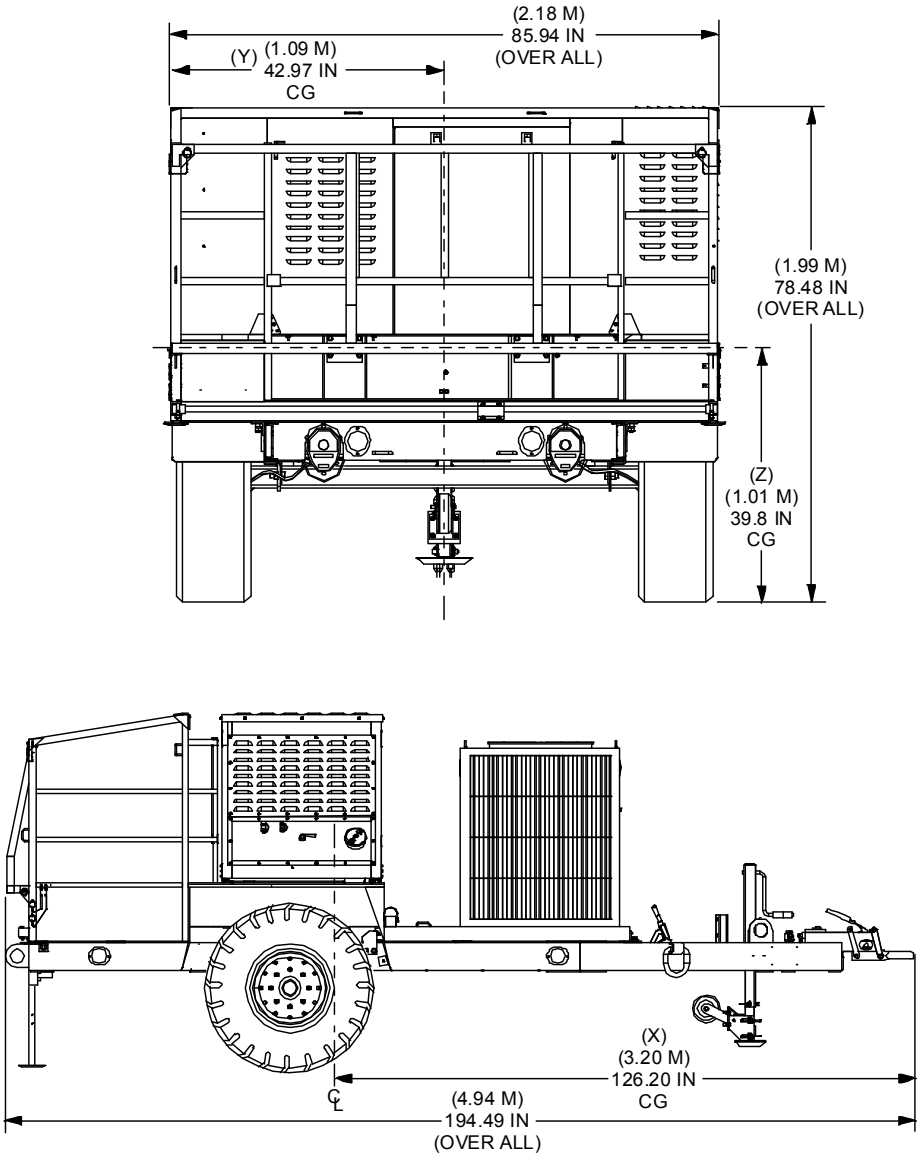


Figure 38. CG of TMSS-MED Trailer.

END OF TASK

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS
TMSS-MED
OPERATION UNDER UNUSUAL CONDITION

INITIAL SETUP:

Personnel Required
Two

References
WP 0005, WP 0011, WP 0019, WP 0030, WP 0042, WP 0058, WP 0089, WP 0094, WP 0101, WP 0109, WP 0111

GENERAL

This work package covers operating the TMSS-MED system in arctic, tropical, and desert climates. This work package also describes off road towing of the trailer.

SECURITY MEASURES FOR ELECTRONIC DATA

Follow the security measures described in AR 25-2, Information Assurance, to control access to classified electronic data. For the TMSS-MED system, follow the procedures described in the current version of the User Security Manual/Standard Operating Procedure (SOP).

UNUSUAL ENVIRONMENT/WEATHER

Arctic Climates

NOTE

Refer to Engine Oil Recommendations (WP 0042, Table 1) for proper Genset oil viscosity in arctic climates.

Refer to Radiator Coolant to Water Ratios (WP 0058, Table 1) for proper Genset engine antifreeze to water ratios for arctic climates.

Sub zero temperatures and climatic conditions associated with cold weather affect the efficient operation of the equipment. Keep equipment as dry as possible. After the equipment has been exposed to the cold and is moved into a warm environment, moisture will collect on the trailer. Dry the external surfaces whenever possible. Follow the instructions and precautions below for operation under such adverse conditions.

Starting the Genset in Arctic Conditions

The Genset is equipped with an engine heater for warming the engine and a fuel heater to warm up the fuel prior to starting the engine in arctic climates.

CAUTION

The engine and fuel line heaters are not required when outside temperatures are above 0°F (-17.77°C).

1. Move Genset Control Panel FUEL LINE HEATER switch to the up position.
2. Move Genset Control Panel ENGINE HEATER switch to the up position.
3. Allow fuel line and engine heaters to operate for approximately 20 minutes before starting engine.
4. Refer to Genset Start Procedure (WP 0005).

END OF TASK

Stopping the Genset in Artic Conditions

1. Move Genset Control Panel FUEL LINE HEATER switch to the down position.
2. Move Genset Control Panel ENGINE HEATER switch to the down position.
3. Refer to Genset Shut Down Procedure (WP 0005).

END OF TASK

Heating the Shelter in Arctic Climates

1. Primary Method. The ECU has electric heating strips that electrically heat the incoming air as it passes over the strips.
   a. Verify that the Air Supply and Return ducts are secured to their respective ports on the shelter as described in Connect ECU Ducts to Shelter and Trailer (WP 0005).
   b. Adjust the Damper on the ECU Return port to reduce the speed of the air flowing into and through the Return Port. The Damper has four positions:
      Open: Position for normal air cooling operation.
      1/3: Position for heating air in mildly cold conditions (minimal heat needed).
      2/3: Position for heating air in cold conditions (nominal heat needed).
      Closed: Position for heating air in extreme cold conditions.
   c. Secure the Supply and Return ducts to their respective ECU ports as described in Connect ECU Ducts to Shelter and Trailer (WP 0005).
   d. Turn the ECU Mode Select knob to HEAT HIGH 18 KW or HEAT LOW 9 KW mode according to the current temperature inside the shelter.
2. Secondary Method. The ECU has an internal auxiliary fuel-fired heater for adding extra heat to the air to the shelter through the Supply duct. The auxiliary heater draws its fuel from the Genset fuel tank.

NOTE

The auxiliary heater can be used to heat the shelter without using the electric (primary) heat.

   a. Turn AUXILIARY HEAT Select knob to MANUAL to provide continuous heat.
   b. Turn AUXILIARY HEAT Select knob to AUTOMATIC to provide thermostat controlled heat to shelter.

END OF TASK

Operation in Tropical Climates

NOTE

Leaving the trailer inactive for long periods during rainy or humid conditions can cause rapid rust. Fungus may develop in the cargo box as well as in shelter component storage bags. Frequent inspections, cleaning, and lubrication are necessary to maintain operational readiness of trailer and shelter.

Refer to Engine Oil Recommendations (WP 0042, Table 1) for proper Genset oil viscosity in tropical climates.

Refer to Radiator Coolant to Water Ratios (WP 0058, Table 1) for proper Genset engine antifreeze to water ratios for tropical climates.

Operation in Tropical Climates - Continued

High relative humidity causes condensation to form on the control panels whenever the temperature of the unit is lower than the surrounding air. To minimize this condition, provide as much ventilation as possible. Dry the unit control panel surfaces. Operate the ECU with the baffle in the open position.

If engine overheating occurs:

1. Turn off ECU to remove all electrical load on Genset, allowing engine to idle.

2. Observe coolant temperature gauge for steady cooling.

CAUTION

Stop engine if coolant temperature gauge suddenly increases beyond approximately 230°F (110°C). Failure to comply will result in damage to engine.

3. If engine coolant temperature continues to increase or does not lower, stop engine. Perform troubleshooting procedures in (Chapter 3).

END OF TASK

Desert Climates

NOTE

Refer to Engine Oil Recommendations (WP 0042, Table 1) for proper Genset oil viscosity in desert climates.

Refer to Radiator Coolant to Water Ratios (WP 0058, Table 1) for proper Genset engine antifreeze to water ratios for desert climates.

Operating the Genset and ECU in dusty or sandy areas requires frequent servicing of air filters and cooling system fluids.

1. Frequently check air intake louvers. If air intake louvers become clogged and inoperable, stop engine and refer to (WP 0101) for emergency air cleaner servicing.

2. If engine overheating occurs:

   a. Turn off all electric loads on Genset and allow engine to idle.

   b. Observe engine coolant temperature gauge for steady cooling.

CAUTION

Stop engine if coolant temperature gauge suddenly increases beyond approximately 230°F (110°C). Failure to comply will result in damage to engine.

   c. If coolant temperature continues to increase or does not lower, stop engine. Perform applicable troubleshooting procedures in (Chapter 3 or Chapter 5).

Trailers completing operation in dusty, sandy areas must be lubricated and serviced by service maintenance as soon as possible.

END OF TASK

Extreme Heat

NOTE

Refer to Engine Oil Recommendations (WP 0042, Table 1) for proper Genset oil viscosity in extreme heat.

Refer to Radiator Coolant to Water Ratios (WP 0058, Table 1) for proper Genset engine antifreeze to water ratios for extreme heat.

Extreme heat exists when ambient temperatures reach 95°F (35°C) or more. The effect of extreme heat on Genset is a decrease in engine efficiency.

Before Operation, perform the following:

1. Perform before operation checks and services.
2. Check for foreign objects in front of radiator and clean as required.
3. Frequently check coolant temperature gauge and oil pressure gauge. Engine is overheating if one or more of the following conditions exist:
    a. Engine coolant temperature is more than approximately 230°F (110°C) as indicated by temperature gauge.
    b. Engine oil pressure drops below approximately 15 psi (103 kPa) with engine under a load.

END OF TASK

OPERATING ECU AS STAND – ALONE UNIT

The ECU may be removed from the trailer and operated as a stand alone unit. The ECU requires 208 VAC, 3 Ø 60 Hz and can draw up to 18 kW of power when operating in the HEAT HIGH/18 KW mode. Before hooking the ECU up to any alternate power source, ensure that sufficient power is present and that other pieces of equipment are not utilizing the power.

1. Remove ECU from trailer as described in ECU Removal/Replacement (WP 0109) and place on supports (i.e., 8" high minimum treated lumber).

2. Connect supply and return ducts to ECU as described in Connect ECU Ducts between the Shelter and the Trailer (WP 0005).

3. If hydronic heater is to be used, remove access panel and attach fuel line to fuel filter and run under ECU to fuel source. If necessary, refer to (WP 0094) of this TM.

WARNING

Prior to performing the following step, ensure that power source is properly shut down. Do not connect ECU to an active connection. Failure to observe this warning can result in serious injury or death to personnel.

CAUTION

Prior to performing the following step, ensure that output connector on power source and connector on ECU power cable mate up properly. Damage to equipment could occur if improper electrical connections are made.

4. Connect ECU power cable to power source.

5. Start power source in accordance with procedures in appropriate TM(s).

NOTE

Prior to performing the following step, ensure that all PMCS (WP 0019 and WP 0089) have been performed on the ECU.

Prior to performing the following step, ensure that all lines (i.e., drip lines, fuel lines, ducts) are not kinked, damaged, or obstructed.

6. Start ECU in accordance with ECU Start Procedure (WP 0005).

7. Ensure the green POWER ON indicator light on ECU Control Panel is lit.

CAUTION

Do not run ECU with red OUT OF PHASE light on. Damage to motor can result.

8. Verify that red OUT OF PHASE light on ECU Control Panel is not on. If OUT OF PHASE light is lit, conduct out of phasing troubleshooting procedures (WP 0011 and WP 0030).

CAUTION

Do not set thermostat below 50 degrees in cool mode and not above 90 degrees in heat mode. Setting thermostat outside this range can cause the ECU to malfunction.

OPERATING ECU AS STAND-ALONE UNIT – Continued

CAUTION

Do not adjust thermostat frequently. Select a temperature and leave it. Frequent adjustment can cause premature failure of thermostat.

Temperature difference between ambient and interior shelter temperature is a function of many variables.

9. Set ECU TEMPERATURE control to desired temperature required to maintain a comfortable interior shelter temperature.

NOTE

Keep all shelter doors and windows, exterior and interior, closed as much as possible to maintain dead air space between exterior and interior covers.

In very hot and sunny conditions, open interior and exterior windows for convection to reduce heat.

Use camouflage netting or other shading means to reduce solar energy absorbed by shelter.

The auxiliary heater is not used under normal operating conditions.

10. Turn ECU MODE SELECT switch to appropriate position. Modes of operation are:

- OFF, no ECU operation.
- FAN, circulating fan only operation.
- COOL, provides cool air and fan operation.
- HEAT LOW 9 KW, utilizes 9 kW of Genset power during heating operations. The remaining power may be used to power ancillary devices.
- HEAT HIGH 18 KW, utilizes 18 kW of Genset power during heating operations. The minimal remaining power may be used to power only a few ancillary devices.

END OF TASK

INTERIM CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR (CBRN) DECONTAMINATION PROCEDURES

CBRN

Contaminants are CBRN agents that have been formulated to kill or to incapacitate human beings.

General Guidance

NOTE

TMSS-MED items rendered inoperable due to contamination do not need to be decontaminated and are to be discarded.

The TMSS-MED is mission-critical. The system is compatible for use by Soldiers in Mission Oriented Protective Posture (MOPP) 4. Operators, using onboard equipment, must be able to conduct immediate decontamination within 15 minutes, operational decontamination using onboard or crew-served equipment within six hours, and thorough decontamination when mission allows reconstitution.

Probable CBRN Situation(s)

Use and storage Techniques, Tactics, and Procedures (TTP) dictate that access to the TMSS-MED is limited to necessary maintenance and critical functions. This limits the exposure risk of components inside the TMSS-MED to CBRN as the TMSS-MED provides a degree of protection. Under normal conditions with the access restricted, the TMSS-MED acts as a self-contained, sealed system only exposed to external contamination. Radiation contamination is unlikely to every system and subsystem. With all critical operational systems protected by the TMSS-MED from contamination and thereby avoiding most risks associated with decontamination and ensuring at least one decontamination-survivable workstation, the TMSS-MED operational capability as a critical system may be degraded but is not destroyed by an CBRN event.

Immediate Decontamination (Equipment Only)

Per FM 3-11.5 referenced in (WP 0111), operator spray-down/wipe-down should be done within 15 minutes. Operators use the M100 Absorbent Decontamination System (ADS) or the onboard M11/M13 decontamination apparatus to decontaminate surfaces that they must touch or contact to operate the equipment. Radiological contamination in the form of dust particles may be wiped, scraped, or brushed off.

Implementation. Decontamination of every surface that must be touched to operate the TMSS-MED is handled in accordance with FM 3-11.5. The same procedures and actions are used for each item of equipment.

Likely Results. Systems incapable of withstanding decontamination are replaced. The TMSS-MED operational capabilities and ease of maintenance become degraded but not destroyed since the vital operational components are shielded inside the facility from most of the effects of the CBRN event. The remaining contaminated systems continue with the decontamination process.

Operational Decontamination

NOTE

Normally the vital operational components would be shielded inside the TMSS-MED from most of the effects of the CBRN event. In the event that a component vital to the operational integrity of the TMSS-MED is contaminated but unlikely to survive the operational decontamination wash-down and contamination does not either hinder the operational ability of the system or pose a significant risk to the operators, operational decontamination should be delayed until such time as a replacement component is available.

Operational Decontamination – Continued

Per FM 3-5, equipment wash-down should be performed within six hours of being contaminated when the mission does not permit a thorough decontamination. This process removes gross contamination and limits its spread.

Implementation. Every contaminated surface is washed down. The same procedures and actions are used for each item of equipment.

Likely Results. Under operational decontamination procedures, every contaminated system that was adequately and immediately decontaminated survives operational decontamination.

Thorough Decontamination

NOTE

In the event that a system vital to the operational integrity of TMSS-MED is contaminated but unlikely to survive the Detailed Equipment Decontamination (DED) and contamination does not either hinder the operational ability of the system or pose a significant risk to the operators, operational decontamination should be delayed until such time as a replacement system is available.

Per FM 3-11.5, DED restores items so that they can be used without MOPP gear. Normally, DED is conducted as part of a reconstitution or during breaks in combat operations. This operation requires support from a chemical decontamination unit.

Implementation. The chemical decontamination unit conducts a DED when the tactical situation permits. The same procedures and actions are used for each item of equipment.

Likely Results. Under thorough decontamination procedures, every system that was adequately and operationally decontaminated survives thorough decontamination.

RADIOACTIVE DECONTAMINATION PROCEDURES

NOTE

The following is only a brief guideline. Complete information may be found in DA PAM 700-48.

Obtain assistance from medical personnel if decontamination of eyes, ears, nose, or mouth is necessary.

Commanders must appoint a Radiation Safety Officer (RSO)/Radiation Protection Officer (RPO)/Radiation Protection Staff Officer (RPSO)/Radiation Control Officer (RCO) at the appropriate unit level. Personnel handling Radiologically Contaminated Equipment (RCE) incur a risk of exposure to and contamination from radioactive materials. Proper radiation safety oversight is essential to minimize personnel exposure potential and to ensure proper follow-up after the incident is over. In addition to the precautions outlined in DA PAM 700-48, personnel handling RCE ensure trained personnel conduct radiation safety monitoring. Such monitoring includes, as a minimum, surveys of personnel and equipment used and bioassays to document any exposure to the RCE handler.

General Decontamination Procedure

The specific decontamination methods and procedures selected for use in particular circumstances depend on the type, extent, and location of the contamination. However, the general approach to decontamination outlined below applies to most situations.

1. Always perform decontamination under the direction of radiation safety personnel.
2. Access to contaminated areas must be controlled.
3. Provide protection, including appropriate clothing, for workers.
4. Evaluate what is to be decontaminated.
5. Obtain necessary equipment and materials.
6. Survey all items to be released to an unrestricted area.
7. Begin with the mildest decontamination method and progress to harsher, more abrasive, or caustic methods as required.
8. Work from the outside of the contaminated area to the inside.
9. Isolate all clean areas from contaminated areas. Cover clean areas adjacent to those being decontaminated with taped down paper, plastic, or other disposable material to prevent recontamination.
10. Minimize the generation of contaminated liquids and airborne radioactivity during the work. Collect and treat as contaminated waste all liquids generated and materials used during decontamination operations.
11. Survey items between major steps in the decontamination process.
12. Continue decontamination until contamination levels are reduced to appropriate levels as per DA PAM 700-48.
13. Document the completion of decontamination, including the name of the individual performing the final survey, the date, and the survey results. Utilize DA Forms 7399-R, 7400, and 7401. These forms are available on the Army Electronic Library CD-ROM and the USAPA website.

END OF TASK

Personnel Decontamination

Before external decontamination of an individual is begun, the following steps should be taken to help establish priorities for decontamination and follow-up effort.

1. Observe any physical effects on the contaminated person (i.e., bleeding, irregular breathing, burns, or shock).
2. Assess the extent of any injuries. Medical treatment of injuries takes priority over decontamination.
3. Determine the extent and magnitude of contamination using personnel survey techniques.
4. Document survey results on DA Form 7399.
5. Remove contaminated clothing, place it in a plastic bag, and hold it for further disposition.
6. Obtain assistance from medical personnel if decontamination of eyes, ears, nose, or mouth is necessary.
7. Personnel should be decontaminated as quickly as possible using the least drastic means necessary.

Personnel Decontamination - Continued

8. Decontamination methods should begin with mild methods, which should be continued as long as they are effective, and progress to harsher methods only as required.

9. Extreme care should be taken to prevent the spread of contamination to any skin or body opening.

10. All liquids generated and materials used during decontamination should be collected and treated as contaminated waste.

11. Personnel performing the decontamination should take all necessary precautions to protect themselves.

12. Cool or lukewarm water should be used for all washing and rinsing. Hot water causes the skin pores to open, driving contamination deeper into the skin. Cold water closes the pores, trapping contamination in the skin.

END OF TASK

Specific Personnel Decontamination Methods

NOTE

In all cases of personnel contamination, the RPO must be consulted. If ingestion or inhalation of radioactive material is suspected, bioassays should be performed.

1. Thorough washing with nonabrasive soap and lukewarm water is the best general method of decontaminating the hands and other parts of the body. If the contaminant is localized, it is often more practical to mask off the affected area and cleanse with swabs rather than risk the danger of spreading the contaminant by general washing. Organic solvents must be avoided as decontaminating agents because they may increase the probability of the radioactive materials penetrating through the pores of the skin. Special attention must be given to the areas between the fingers and around the nails. The outer edges of the hands are easily contaminated and must not be neglected in the washing.

2. After repeated washings, the skin may tend to chap. To avoid this, apply lanolin or hand cream and then continue to wash. If repeated washing with soap and water is unsuccessful in the personnel decontamination, the individual should be referred to the local medical officer for application of the more drastic chemical decontamination.

3. In the event several individuals have become contaminated or the contamination on an individual is not localized to a small portion of the body, the following decontamination procedure is recommended.

    a. Place individual in a lukewarm shower.

    b. Using a mild soap, individual should cover entire body with lather.

    c. While still covered with lather, individual should step out of shower.

    d. Sprinkle a heavy coat of mild soap flakes all over lathered individual (purpose of lather is to cause soap flakes to adhere to person).

    e. Using hands, the contaminated individual rubs the soap flakes on the body into a paste.

NOTE

It is necessary for the contaminated individual to rub body surfaces with their hands while rinsing in order to remove soap paste. Soap paste remains on those areas that have not been thoroughly washed. Although a soft cloth may be used, a brush may not. Particular attention should be given to hairy portions of the body.

Specific Personnel Decontamination Methods - Continued

f. The contaminated individual returns to shower and rinses soap off the body by starting at the top and working downward.

g. When the individual has rinsed to the point that the individual no longer feels slimy and while still under shower, the individual should be examined by an assistant for traces of soap. The presence of soap indicates which areas of the body have not been decontaminated.

h. After removing all traces of soap, the individual should leave the shower and dry the body.

i. After drying off, the individual must be monitored. If still contaminated, repeat above procedures. In the event residual contamination is localized, repeat decontamination procedures to those areas still showing contamination.

END OF TASK

Equipment and Material Decontamination

NOTE

Contaminated soil around accident and water runoff should be scraped up and containerized for removal as radioactive waste.

Materials that cannot be easily or cost-effectively decontaminated should be evaluated for possible disposal as radioactive waste. Porous items (e.g., wood, paper, cloth), intricately designed equipment, and items of low replacement cost tend to fall in this category. If decontamination of equipment and/or materials is required, many cleaning, abrasive, chemical, and electrochemical methods are available. Listed here are a few of the simpler and least costly methods. These methods should be repeated until surveys indicate the need for harsher methods. Under no circumstances is dry sweeping of radioactive contamination allowed. Appropriate Personal Protection Equipment (PPE) must be worn.

- Place masking, adhesive, friction, or duct tape over the contaminated area; remove. When removed, discard as radioactive waste.

- Use vacuum-cleaning techniques with a conventional wet or dry vacuum cleaner modified to include a High-Efficiency Particulate Air (HEPA) filter on the exhaust. Dispose of bag or collection container as radioactive waste. Respiratory protection must be used. **If a HEPA filter is not available, do not vacuum.**

- Wipe or wet mop using a decontaminating agent or detergents and hot water.

END OF TASK

JAMMING AND ELECTRONIC COUNTERMEASURES (ECM) PROCEDURE

The TMSS-MED system is not subject to jamming.

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS
TMSS-MED
EMERGENCY SHUTDOWN PROCEDURES

INITIAL SETUP:

Personnel Required
One

Equipment Condition
Equipment ON

References
WP 0004

GENERAL

This work package contains procedures for the emergency shutdown of the various pieces of equipment of the TMSS-MED. Refer to Description and Use of Operator Controls, Indicators, and Connectors (WP 0004) for more information about the location and function of controls, indicators, and connectors.

EMERGENCY SHUTDOWN PROCEDURES

Emergency Genset Operation

A Battle Short Switch on the Genset Control Panel is used when the Genset must remain running regardless of operating conditions. The BATTLE SHORT switch overrides any automatic system shutdown protection devices (such as low oil pressure, high water temperature) to keep the Genset operating.

1. Lift up the BATTLE SHORT switch cover on the Genset Control Panel.

2. Move the BATTLE SHORT switch to UP position.

To disengage the Battle Short Override, close the BATTLE SHORT switch cover by pressing down. Closing the switch cover will turn off the BATTLE SHORT switch.

Emergency Power Down of Genset

1. Press the EMERGENCY STOP button on the Circuit Breaker Panel to immediately terminate all power from the Genset.

2. After shutdown, set all circuit breakers on the Circuit Breaker Panel and ECU control panel to the OFF position.

Emergency Power Down of ECU

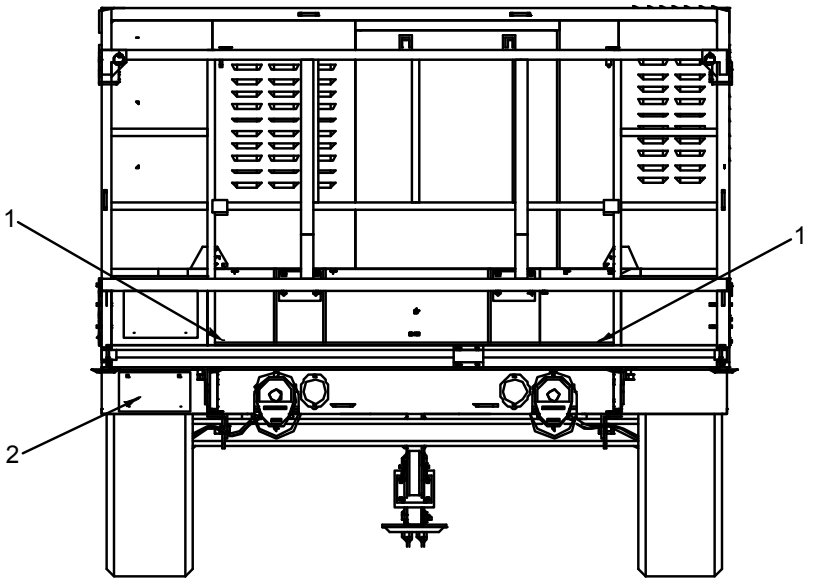
1. If the ECU is running on power from the Genset, press EMERGENCY STOP on the Genset Circuit Breaker Panel to immediately stop all power to the ECU.

2. If the ECU is running on an external power source (i.e., shore power), set MODE SELECT switch on the ECU Control Panel to OFF to stop the unit.

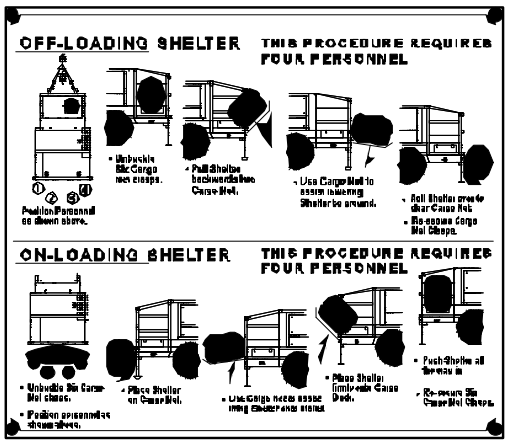
END OF WORK PACKAGE

OPERATOR INSTRUCTIONS
TMSS-MED
STOWAGE AND DECAL/DATA PLATE GUIDE

TRAILER



LABEL 2



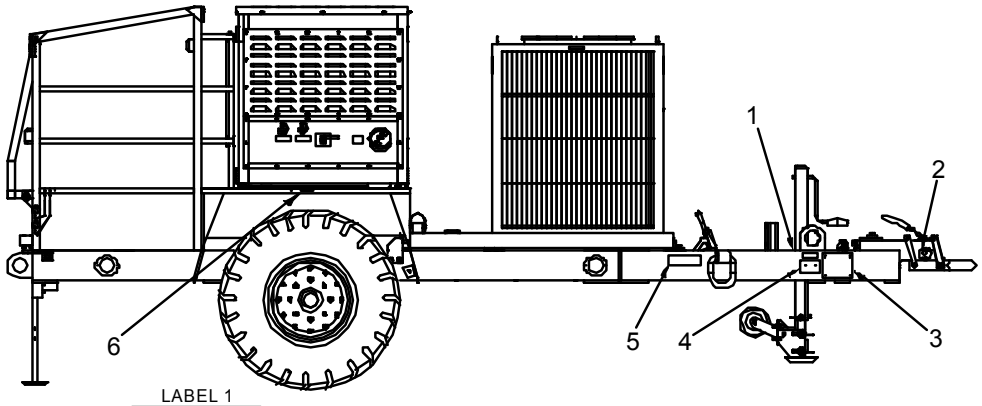
LABEL 1

LIFT

Figure 1. Location of Identification and Data Plates on Trailer Rear.

Table 1. Identification and Data Plates on Trailer Rear.

LABEL	DESCRIPTION
1	Stencil – Identifies location of proper Lift point on trailer.
2	Instruction plate – Black with white text. Informs user of procedure required to unload shelter from trailer bed.



LABEL 1

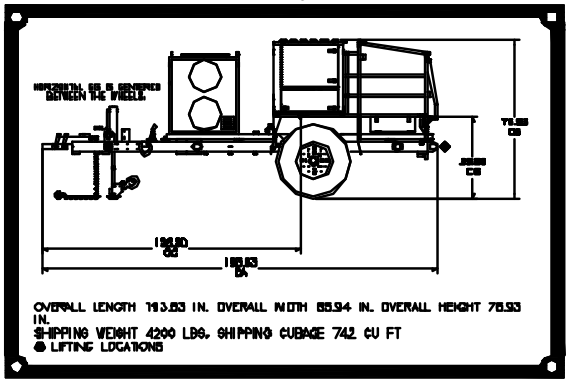
LIFT

LABEL 2

ACTUATOR

LOCK OUT

LABEL 3


OVERALL LENGTH 713.53 IN. OVERALL WIDTH 85.94 IN. OVERALL HEIGHT 76.53 IN.
SHIPPING WEIGHT 4200 LBS. SHIPPING CUBAGE 742 CU FT
4 LIFTING LOCATIONS

LABEL 4

DOLLY WHEEL/SKID PLATE ASSEMBLY MUST BE STORED ON POST WHEN TOWING

LABEL 5

TIE DOWN

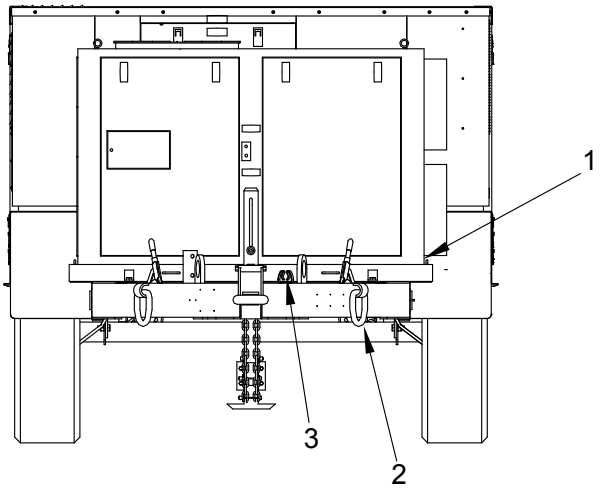
LABEL 6

TP - 20

Figure 2. Location of Identification and Data Plates on Trailer Curbside.

Table 2. Identification and Data Plates on Trailer Curbside.

LABEL	DESCRIPTION
1	Stencil – Identifies location of proper Lift point on trailer.
2	Instruction plate – Black with white text. Informs user of Actuator Lock Out.
3	Shipping instruction plate - Black with white text. Provides overall dimensions and Center of Gravity data required for lifting and shipping.
4	Instruction plate – Black with white text. Informs user of proper location/storage of dolly wheel/skid plate during transport of trailer.
5	Stencil – Identifies location of proper Tie Down point on trailer.
6	Instruction plate – Black with white text. Informs user of tire pressures required.



LABEL 1

CAUTION: FOR BEST OPERATING PERFORMANCE, LEVEL THE TRAILER BEFORE START UP. THE BUBBLE SHOULD BE TOUCHING THE RING (MIN).

LABEL 2

MANUFACTURED BY:

DATE [ ] CVWR [ ]
GAWR ALL AXLES [ ]
WITH [ ] TIRES AT
[ ] PSI COLD WITH [ ] RIMS.

VIN [ ]

LABEL 3

CARC

Figure 3. Location of Identification and Data Plates on Trailer Front.

Table 3. Identification and Data Plates on Trailer Front.

LABEL	DESCRIPTION
1	Caution plate - Red with white text. Warns user of importance of trailer being level before operating system.
2	Vehicle Identification Plate – Black with white text. Provides VIN, Model number, weight, and other pertinent data about the trailer of the TMSS-MED.
3	CARC stenciling – Reminds personnel of presence of CARC paint.

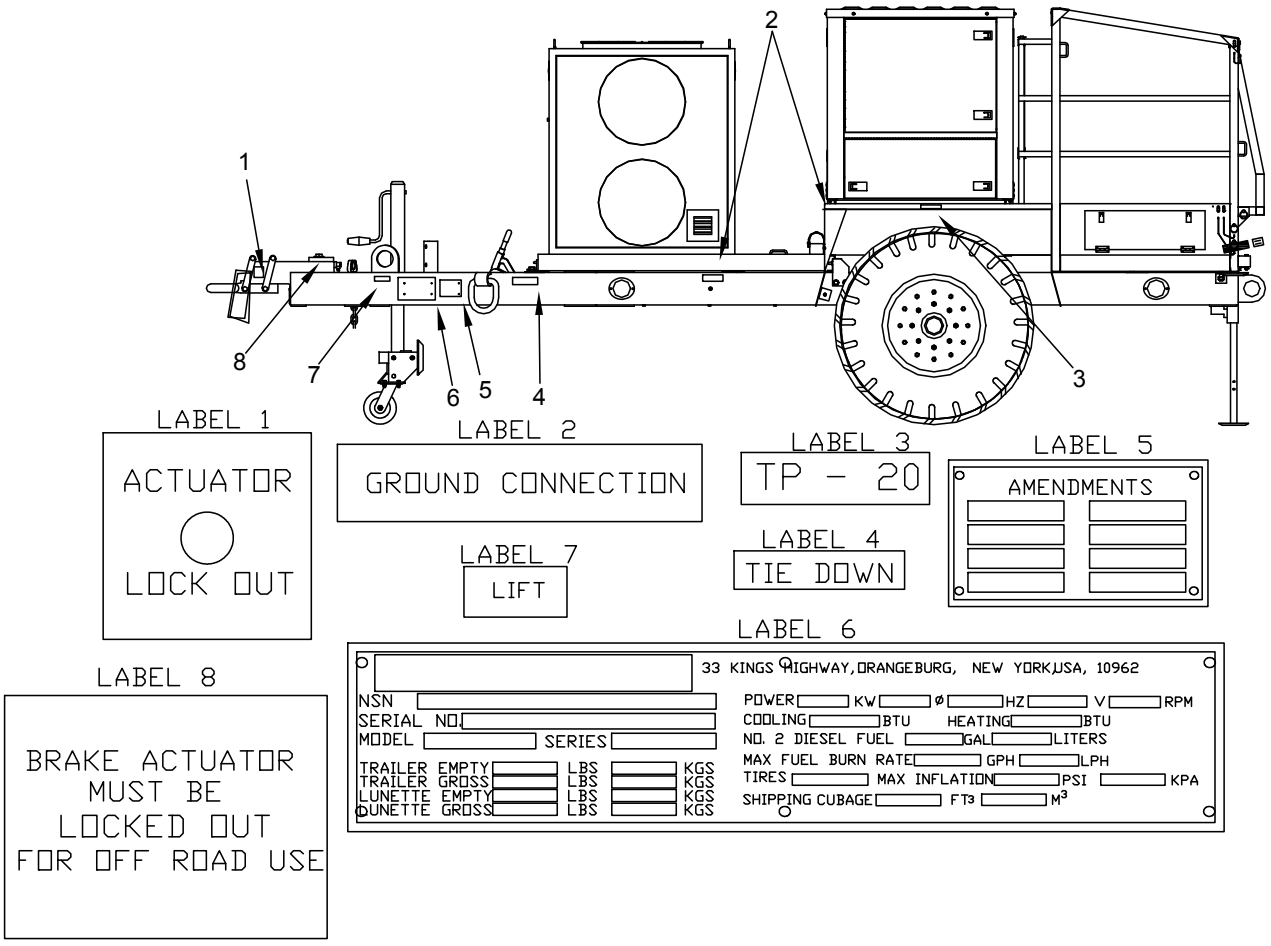


Figure 4. Location of Identification and Data Plates on Trailer Roadside.

Table 4. Identification and Data Plates on Trailer Roadside.

LABEL	DESCRIPTION
1	Instruction plate – Black with white text. Informs user of Actuator Lock Out.
2	Instruction plate – Black with white text. Informs user of system ground connection location on trailer.
3	Instruction plate – Black with white text. Informs user of tire pressures required.
4	Stencil – Identifies location of proper Tie Down point on trailer.
5	Amendment Plate - Black with white text. Provides information regarding modifications to system.
6	Vehicle Identification Plate – Black w/white text. Provides VIN, Model number, weight, and other pertinent data about the TMSS-MED.
7	Stencil – Identifies location of proper Lift point on trailer.
8	Instruction plate – Red with white text. Informs user of Actuator Lock Out.

ECU

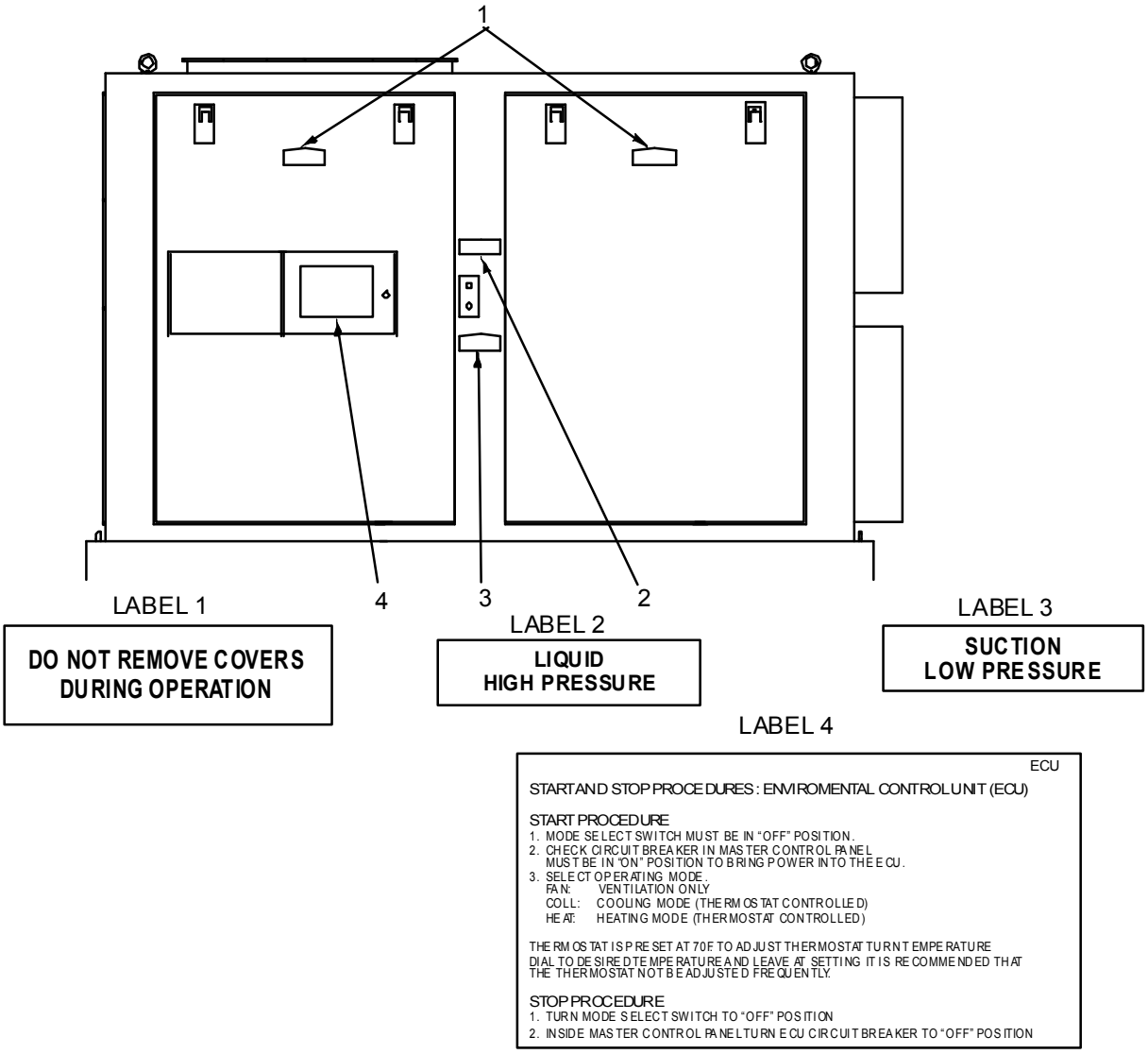
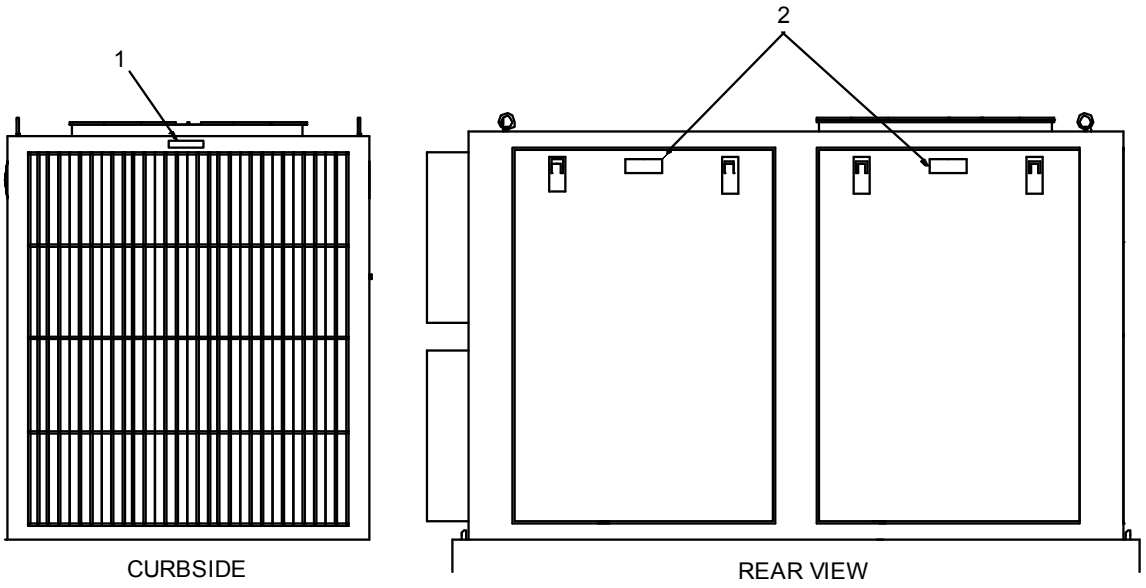

1
4
3
2
LABEL 1
DO NOT REMOVE COVERS
DURING OPERATION
LABEL 2
LIQUID
HIGH PRESSURE
LABEL 3
SUCTION
LOW PRESSURE
LABEL 4
ECU
START AND STOP PROCEDURES: ENVIROMENTAL CONTROL UNIT (ECU)
START PROCEDURE
1. MODE SELECT SWITCH MUST BE IN "OFF" POSITION.
2. CHECK CIRCUIT BREAKER IN MASTER CONTROL PANEL MUST BE IN "ON" POSITION TO BRING POWER INTO THE ECU.
3. SELECT OPERATING MODE.
FAN: VENTILATION ONLY
COLL: COOLING MODE (THERMOSTAT CONTROLLED)
HEAT: HEATING MODE (THERMOSTAT CONTROLLED)
THERMOSTAT IS PRESET AT 70F TO ADJUST THERMOSTAT TURN TEMPERATURE DIAL TO DESIRED TEMPERATURE AND LEAVE AT SETTING IT IS RECOMMENDED THAT THE THERMOSTAT NOT BE ADJUSTED FREQUENTLY.
STOP PROCEDURE
1. TURN MODE SELECT SWITCH TO "OFF" POSITION
2. INSIDE MASTER CONTROL PANEL TURN ECU CIRCUIT BREAKER TO "OFF" POSITION

Figure 5. Location of Identification and Data Plates on ECU Front.

Table 5. Identification and Data Plates on ECU Front.

LABEL	DESCRIPTION
1	Warning plate - Red with white text. Warns user not to remove access cover during operation of ECU.
2	Instruction plate – Red with white text. Informs user of high pressure connection on ECU.
3	Instruction plate – Red with white text. Informs user of low pressure connection on ECU.
4	Instruction plate – Black with white text. Instructs user on operational procedures for the ECU.



LABEL 1

DO NOT PRESSURE WASH

LABEL 2

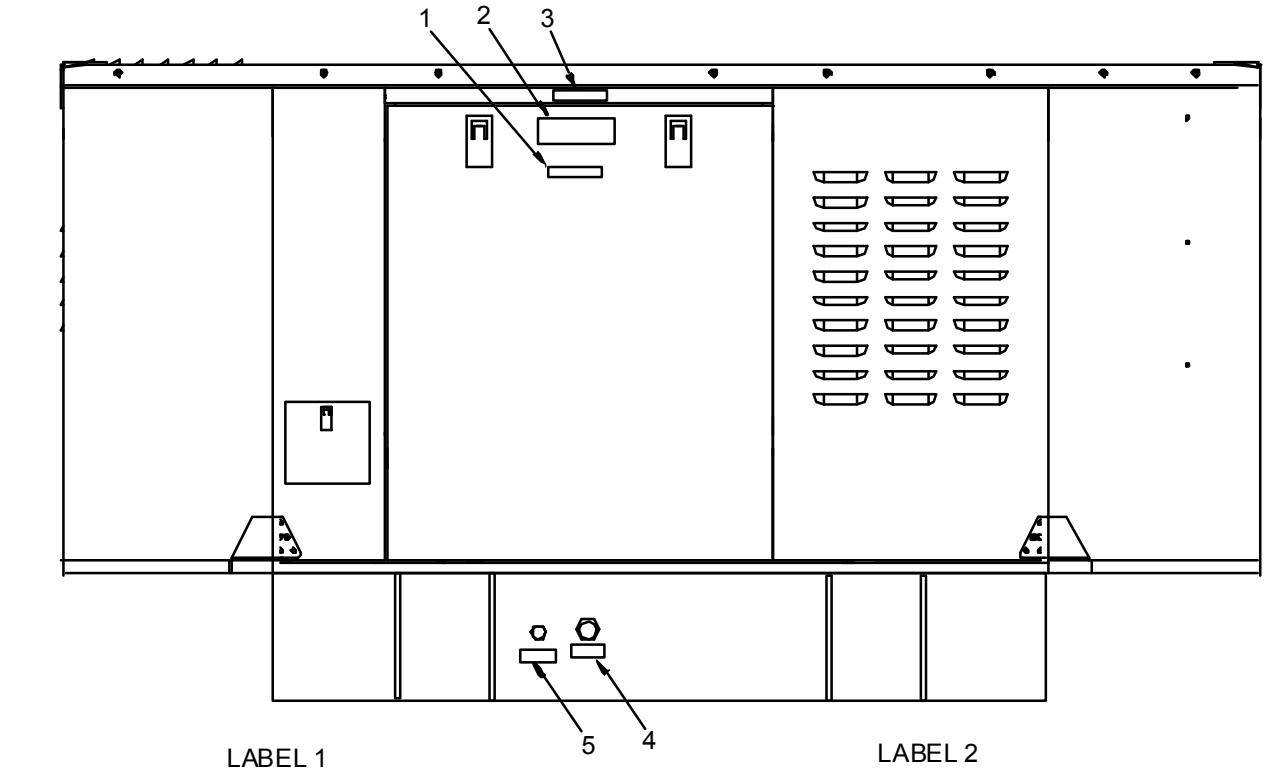
DO NOT REMOVE COVERS DURING OPERATION

Figure 6. Location of Identification and Data Plates on ECU Curbside and Rear.

Table 6. Identification and Data Plates on ECU Curbside and Rear.

LABEL	DESCRIPTION
1	Instruction plate – Black with white text. Informs user not to pressure wash ECU fins.
2	Warning plate – Red with white text. Warns user not to remove access cover during operation of ECU.

GENSET



LABEL 1

WARNING: DO NOT REMOVE DURING OPERATION

LABEL 2

CAUTION: WHILE PERFORMING MAINTENANCE WITH ENGINE RUNNING, WEAR APPROVED HEARING PROTECTION

LABEL 3

DO NOT STEAM CLEAN INSIDE ENCLOSURE

LABEL 4

LUBE OIL DRAIN

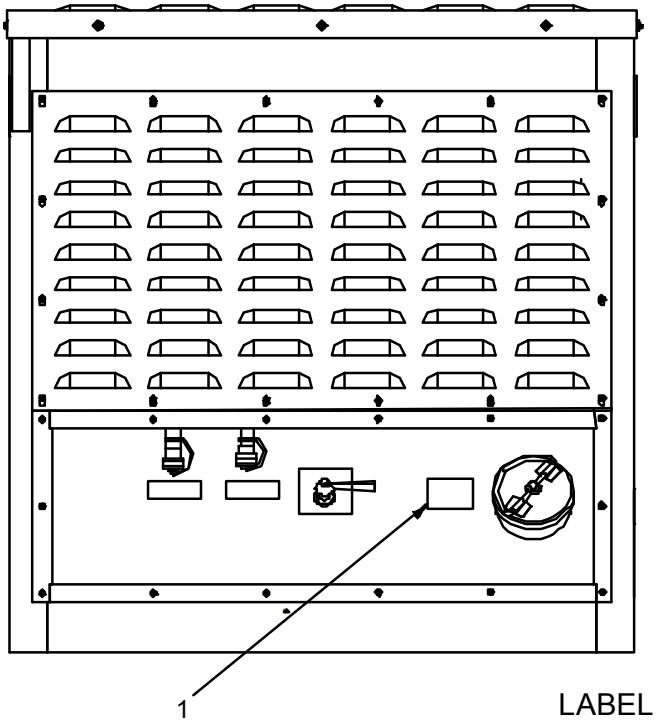
LABEL 5

COOLANT DRAIN

Figure 7. Location of Identification and Data Plates on Genset Front.

Table 7. Identification and Data Plates on Genset Front.

LABEL	DESCRIPTION
1	Warning plate - Red with white text. Warns user not to remove access cover during operation of Genset.
2	Caution plate – Black with white text. Reminds user to wear appropriate protection equipment when Genset is operational.
3	Instruction plate – Black with white text. Informs user not to steam clean engine.
4	Instruction plate – Black with white text. Informs user of Genset lube oil drain plug.
5	Instruction plate – Black with white text. Informs user of location of Genset coolant drain plug.



LABEL 1

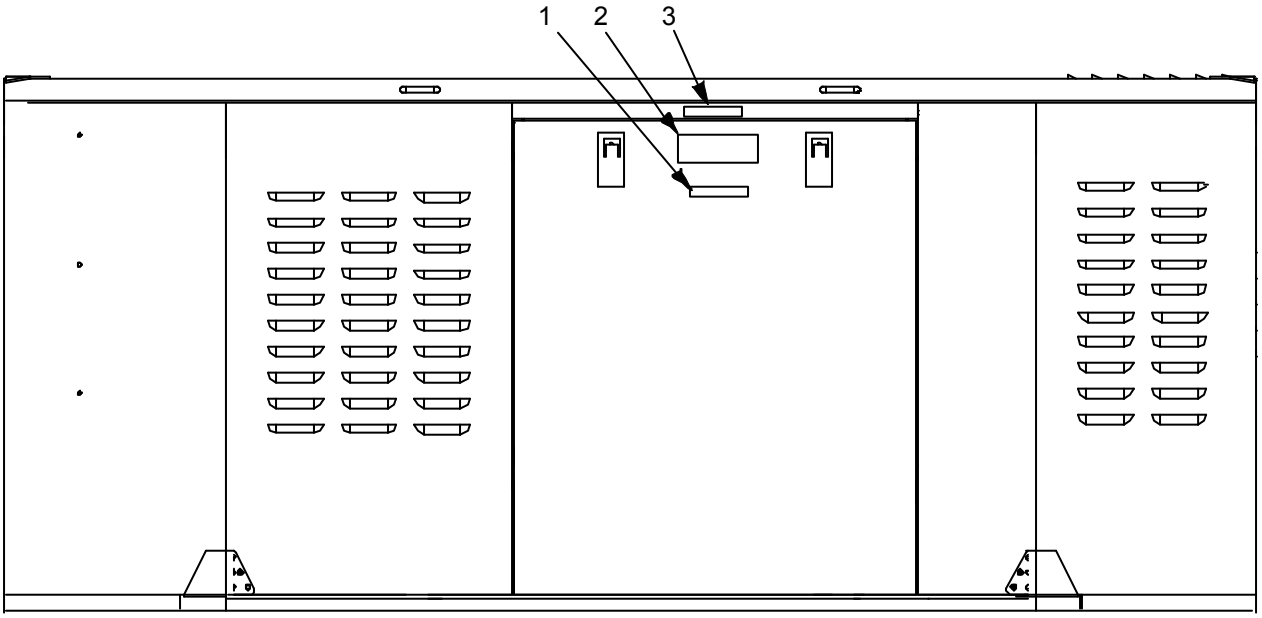
DIESEL FUEL RECOMMENDED

JP8 MAY BE USED JP4/JP5 AND KEROSENE ARE NOT TO BE USED

Figure 8. Location of Identification and Data Plates on Genset Curbside.

Table 8. Identification and Data Plates on Genset Curbside.

LABEL	DESCRIPTION
1	Instruction plate – Black with white text. Informs user of fuel used by Genset.



LABEL 1

WARNING: DO NOT REMOVE DURING OPERATION

LABEL 3

DO NOT STEAM CLEAN INSIDE ENCLOSURE

LABEL 2

CAUTION: WHILE PERFORMING MAINTENANCE WITH ENGINE RUNNING WEAR APPROVED HEARING PROTECTION

Figure 9. Location of Identification and Data Plates on Genset Rear.

Table 9. Identification and Data Plates on Genset Rear.

LABEL	DESCRIPTION
1	Warning plate - Red with white text. Warns user not to remove access cover during operation of Genset.
2	Caution plate – Black with white text. Reminds user to wear appropriate protection equipment when Genset is operational.
3	Instruction plate – Black with white text. Informs user not to steam clean engine.

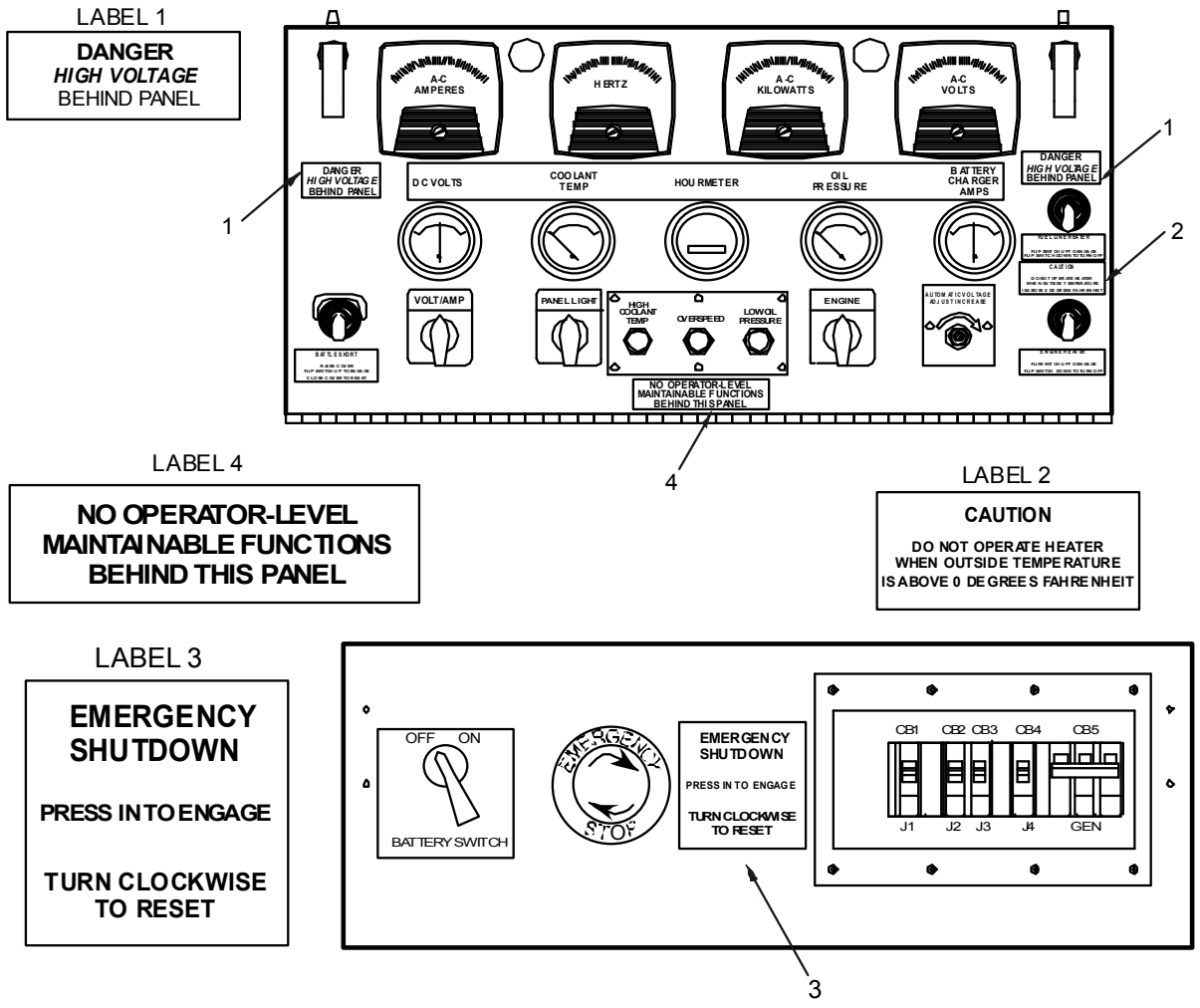
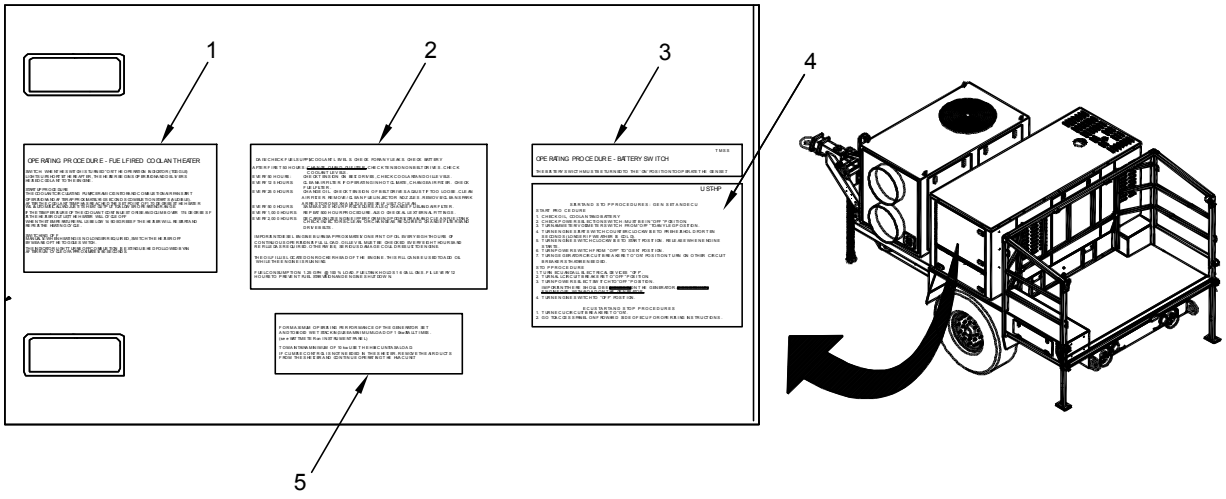


Figure 10. Location of Identification and Data Plates on Genset Control Panel and Circuit Breaker Panel.

Table 10. Identification and Data Plates on Genset Control Panel and Circuit Breaker Panel.

LABEL	DESCRIPTION
1	Warning plate – Red with white text. Informs user of presence of high voltage.
2	Warning plate – Red with white text. Informs user that heater should not be operated when temperature is above 0° F (-17.77°C).
3	Instruction plate – Red with white text. Instructs user on emergency shut down of Genset.
4	Warning plate – Red with white text. Informs user that no crew maintenance present behind control panel.



LABEL 1

OPERATING PROCEDURE - FUEL FIRED COOLANT HEATER

SWITCH: WHEN THE SWITCH IS TURNED "ON" THE OPERATION INDICATOR (TOGGLE) LIGHTS UP. SHORTLY THEREAFTER, THE HEATER BEGINS OPERATION AND DELIVERS HEATED COOLANT TO THE ENGINE.

STARTUP PROCEDURE
THE COOLANT CIRCULATING PUMP, CERAMIC IGNITOR AND COMBUSTION AIR FAN START OPERATION AND AFTER APPROXIMATELY 60 SECONDS COMBUSTION STARTS (AUDIBLE). AFTER THE COOLANT TEMP HAS REACHED THE SET POINT OF 170 DEGREES THE HEATER WILL AUTOMATICALLY ADJUST ITS HEAT OUTPUT TO A LOWER OPERATING RANGE. IF THE TEMPERATURE OF THE COOLANT CONTINUES TO RISE AND CLIMB OVER 174 DEGREES F AT THE HEATER OUTLET, THE HEATER WILL CYCLE OFF. WHEN THE TEMPERATURE FALLS BELOW 149 DEGREES F THE HEATER WILL RESTART AND REPEAT THE HEATING CYCLE.

SWITCHING OFF
MANUALLY: WHEN HEATING IS NO LONGER REQUIRED, SWITCH THE HEATER OFF BY MEANS OF THE TOGGLE SWITCH.
THE INDICATOR LIGHT TURNS OFF, COMBUSTION IS EXTINGUISHED FOLLOWED BY AN AFTER RUN CYCLE OF APPROXIMATELY 90 SECONDS.

LABEL 2

TMSS-MED

DAILY: CHECK FUEL SUPPLY, COOLANT LEVELS. CHECK FOR ANY LEAKS. CHECK BATTERY.

AFTER FIRST 50 HOURS: CHANGE OIL AND OIL FILTER. CHECK TENSION ON BELT DRIVES. CHECK COOLANT LEVELS.

EVERY 50 HOURS: CHECK TENSION ON BELT DRIVES, CHECK COOLANT AND OIL LEVELS.
EVERY 125 HOURS: CLEAN AIR FILTER. IF OPERATING IN HOT CLIMATE, CHANGE AIR FILTER. CHECK FUEL FILTER.
EVERY 250 HOURS: CHANGE OIL. CHECK TENSION OF BELT DRIVES. ADJUST IF TOO LOOSE. CLEAN AIR FILTER. REMOVE/CLEAN FUEL INJECTOR NOZZLES. REMOVE/CLEAN SPARK ARRESTOR ON EXHAUST. USE DIESEL FUEL TO CLEAN.
EVERY 500 HOURS: SAME AS 250 HOUR PROCEDURE. ALSO, CHANGE FUEL AND AIR FILTER.
EVERY 1,000 HOURS: REPEAT 500 HOUR PROCEDURE. ALSO CHECK ALL EXTERNAL FITTINGS.
EVERY 2,000 HOURS: DECARBONIZE ENGINE IF PERFORMING POORLY. DRAIN AND CLEAN FUEL TANK. CHECK INJECTORS - CLEAN OR CHANGE AS REQUIRED. CHANGE FILTERS AND DRIVE BELTS.

IMPORTANT: DIESEL ENGINE BURNS APPROXIMATELY ONE PINT OF OIL EVERY EIGHT HOURS OF CONTINUOUS OPERATION AT FULL LOAD. OIL LEVEL MUST BE CHECKED EVERY EIGHT HOURS AND REFILLED AS REQUIRED. OTHERWISE, SERIOUS DAMAGE COULD RESULT TO ENGINE.

THE OIL FILL IS LOCATED ON ROCKER HEAD OF THE ENGINE. THIS FILL CAN BE USED TO ADD OIL WHILE THE ENGINE IS RUNNING

FUEL CONSUMPTION: 1.25 GPH @ 100% LOAD. FUEL TANK HOLDS 16 GALLONS. FILL EVERY 12 HOURS TO PREVENT FUEL STARVATION AND ENGINE SHUTDOWN.

LABEL 3

TMSS

OPERATING PROCEDURE - BATTERY SWITCH

THE BATTERY SWITCH MUST BE TURNED TO THE 'ON' POSITION TO OPERATE THE GENSET

LABEL 4

UST-HP

START AND STOP PROCEDURES: GEN SET AND ECU

START PROCEDURE
1. CHECK OIL, COOLANT AND BATTERY.
2. CHECK POWER SELECTION SWITCH: MUST BE IN "OFF" POSITION.
3. TURN AMMETER/VOLTMETER SWITCH FROM "OFF" TO ANY LEG POSITION.
4. TURN ENGINE START SWITCH COUNTERCLOCKWISE TO PREHEAT. HOLD FOR TEN SECONDS (LONGER IF WEATHER IS COLD).
5. TURN ENGINE SWITCH CLOCKWISE TO START POSITION. RELEASE WHEN ENGINE STARTS.
6. TURN POWER SWITCH FROM "OFF" TO "GEN" POSITION.
7. TURN GENERATOR CIRCUIT BREAKERS TO "ON" POSITION. TURN ON OTHER CIRCUIT BREAKERS THAT ARE NEEDED.

STOP PROCEDURE
1. TURN ECU AND ALL ELECTRICAL DEVICES "OFF".
2. TURN ALL CIRCUIT BREAKERS TO "OFF" POSITION.
3. TURN POWER SELECT SWITCH TO "OFF" POSITION. IMPORTANT THERE SHOULD BE NO LOAD ON THE GENERATOR. DO NOT SHUT ENGINE OFF WITH A LOAD ON THE GENERATOR.
4. TURN ENGINE SWITCH TO "OFF" POSITION.

ECU START AND STOP PROCEDURES
1. TURN ECU CIRCUIT BREAKERS TO "ON".
2. GO TO ACCESS PANEL ON FROWARD SIDE OF ECU FOR OPERATING INSTRUCTIONS.

LABEL 5

FOR MAXIMUM OPERATING PERFORMANCE OF THE GENERATOR SET AND TO AVOID WET STACKING, USE A MINIMUM LOAD OF 10kw AT ALL TIMES. (see WATTMETER on INSTRUMENT PANEL)

TO MAINTAIN A MINIMUM OF 10kw, USE THE HVAC UNIT AS A LOAD.
IF CLIMATE CONTROL IS NOT NEEDED IN THE SHELTER, REMOVE THE AIR DUCTS FROM THE SHELTER AND CONTINUE OPERATING THE HVAC UNIT

Figure 11. Location of Identification and Data Plates on Genset Control Panel Access Door.

Table 11. Identification and Data Plates on Genset Control Panel Access Door.

LABEL	DESCRIPTION
1	Instruction plate – Black with white text. Informs user of Operating Procedures for Fuel Fired Coolant Heater.
2	Instruction plate – Black with white text. Informs user of scheduled PMCS.
3	Instruction plate – Black with white text. Informs user of required setting of BATTERY SWITCH for Genset operation.
4	Instruction plate – Black with white text. Informs user of start and stop procedures for Genset and ECU.
5	Instruction plate – Black with white text. Informs user of load requirements on Genset to prevent wet stacking.

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS
TMSS-MED
ON-VEHICLE EQUIPMENT LOADING PLAN

SCOPE

The following illustrations and tables assist in identifying all on-vehicle equipment when the TMSS-MED system is ready to deploy.

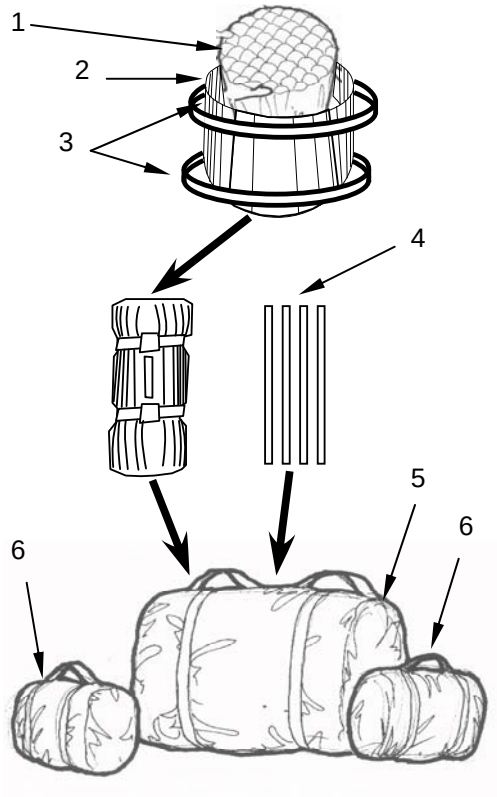


Figure 1. TMSS-MED Shelter Loading Plan.

Table 1. TMSS-MED Shelter Loading Plan.

ITEM NO.	ITEM NAME	QUANTITY
1	Main shelter	1
2	Shelter floor	1
3	Cinch straps	2
4	Push poles	4
5	Shelter transport bag	1
6	Shelter end caps	2

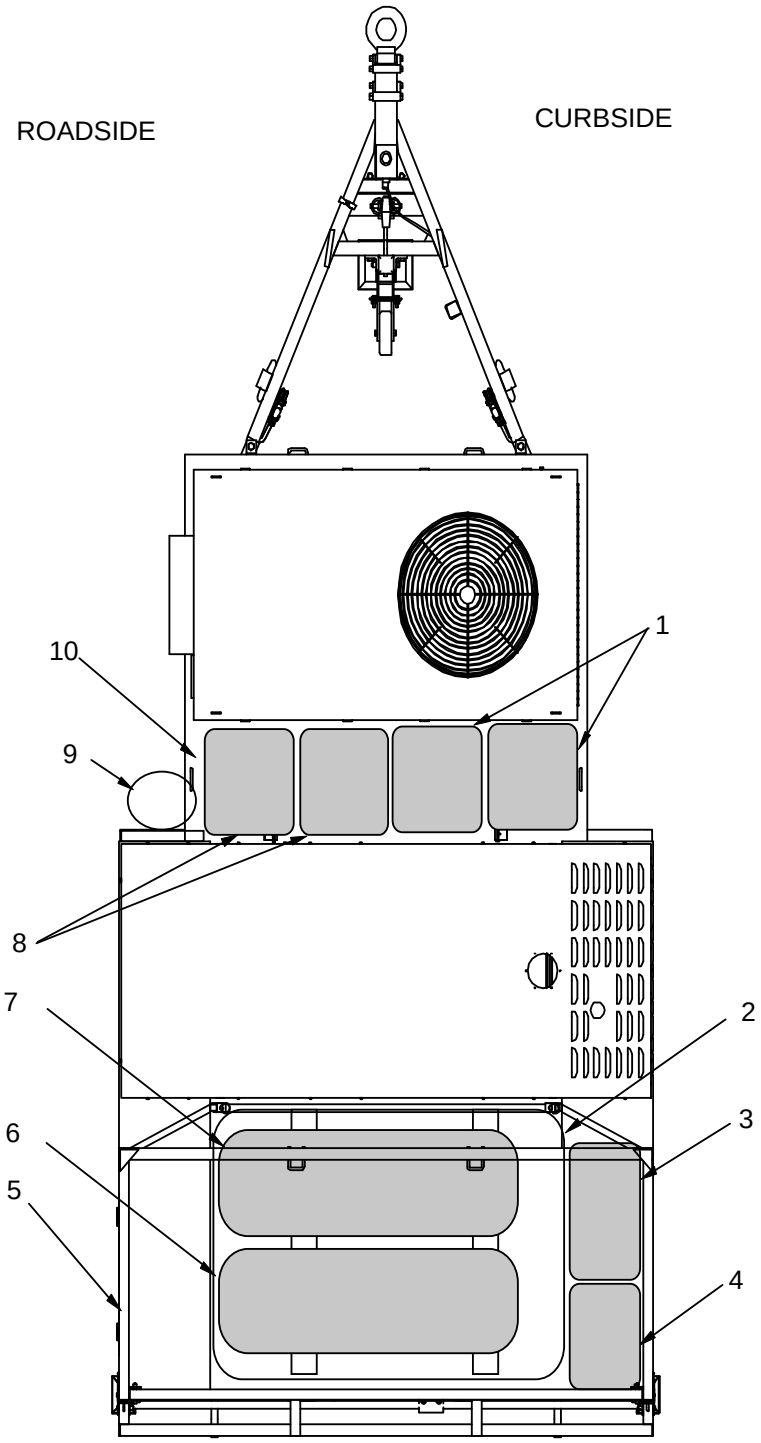


Figure 2. TMSS-MED Trailer Loading Plan.

Table 2. TMSS-MED Trailer Loading Plan.

ITEM NO.	ITEM NAME	QUANTITY
1	ECU Ducts (1-supply, 1-return) (in cargo bags)	2
2	Shelter (in cargo bag)	1
3	Electrical Wiring kit (in cargo bag)	1
4	Stake set (in cargo bag)	1
5	Storage compartment which holds:	
	Shelter repair kit	1
	Funnel	1
	Auxiliary fuel lines	1
	Technical Manual TM 11-6115-742-13&P	1
	250 hour push pack	1
6	End cap (in cargo bag)	1
7	End cap (in cargo bag)	1
8	Shelter light set (in cargo bag)	2
9	Dry chemical fire extinguisher	1
10	Ground Rod Assembly (not shown)	1

END OF WORK PACKAGE

CHAPTER 3

CREW TROUBLESHOOTING PROCEDURES FOR TMSS-MED

CREW TROUBLESHOOTING PROCEDURES
TMSS-MED
CREW TROUBLESHOOTING INDEX

GENERAL

This WP contains a troubleshooting index of conditions/indications that may develop during maintenance or operation. Maintenance is limited to those failures that may be repaired at the crew level. The troubleshooting index identifies the condition/indication, which is followed by a column that identifies the work package and page(s) where crew level troubleshooting procedure(s) may be found (in the form of an inspection), followed by simple corrective actions which may be done by the crew. These inspections and corrective actions should be performed in the order listed. The index is provided to assist in the quick location of a problem. The manual cannot list all conditions/indications that may occur. If a condition/indication is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

TROUBLESHOOTING INDEX

The troubleshooting index assists the operator after a fault occurs. When a fault occurs, carefully inspect the equipment for fault indications to determine the best condition/indication to follow. The most important step in troubleshooting is recognizing the conditions/indications and combination of conditions/indications. Use the corrective action for a given condition/indication in the order of appearance. If the first repair attempt is unsuccessful, proceed to the next recommended corrective action to resolve the problem. If a fault is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

Except for the equipment in the Crew Troubleshooting Index (Table 1), refer to appropriate technical manual(s) for any remoted equipment. (Table 1) is provided as a tool to maintain equipment in good operating condition and ready for its primary mission.

Table 1. Crew Troubleshooting Index.

ITEM	CONDITION/INDICATION	WP
	GENSET (Engine)	
1	Coolant leaking	0011-2
2	Fuel leaking	0011-2
3	Oil leaking	0011-2
4	Battery acid leaking	0011-3
5	Engine does not crank	0011-3
6	Engine turns over slowly	0011-3
7	Engine cranks but does not start	0011-3
8	Engine cranks but does not start (ambient temperature below 32°F (0°C))	0011-3
9	Engine stops (no warning lights)	0011-4
10	Engine stops (HIGH COOLENT TEMP warning light on)	0011-4
11	Engine stops (LOW OIL PRESSURE warning light on)	0011-4
12	Engine stops (OVERSPEED warning light on)	0011-5
13	Excessive carbon deposits appear on exhaust outlet	0011-5
14	Engine emits excessive smoke	0011-5
15	DC VOLT meter reads below 28 VDC while Genset is running	0011-5
16	Engine temperature remains below 120°F (48.88°C)	0011-5
17	AC KILOWATTS meter reads 0 with Genset under load	0011-5
18	Engine temperature above 220°F (104.4°C), engine still running	0011-5
19	Engine oil pressure reading below 20 psi, engine still running	0011-6
20	Engine heater (Hydronic) will not start (no fault code)	0011-6
21	Engine heater (Hydronic) (fault code F01 or F02)	0011-6

Table 1. Crew Troubleshooting Index – Continued.

ITEM	CONDITION/INDICATION	WP
	GENSET (Engine) - Continued	
22	Engine heater (Hydronic) (fault code F03)	0011-6
23	Engine heater (Hydronic) (fault code F04, F05, F06, F07, F08, F09, F010)	0011-6
	GENSET (Electrical)	
1	Generator produces no voltage	0012-2
2	Generator produces low voltage (under no load condition)	0012-2
3	Generator produces low voltage (under load condition)	0012-2
4	Generator produces high voltage (under no load condition)	0012-2
5	Generator produces high voltage (under load condition)	0012-2
6	Generator voltage fluctuates/wanders	0012-3
7	Generator frequency out of tolerance	0012-3
8	Generator builds voltage from start-up then goes to low voltage	0012-3
	ECU	
1	ECU will not run on Genset power	0013-2
2	ECU will not run on shore power	0013-2
3	Voltage out of phase (red light on ECU control panel light)	0013-2
4	Conditioned air too cold (in Heat mode)	0013-2
5	Conditioned air too warm (in Cool mode)	0013-2
6	Evaporator or condenser fan does not operate	0013-3
7	Coolant leaking	0013-3
8	Fuel leaking	0013-3
9	Hydronic heater will not start (no fault code)	0013-3
10	Hydronic heater (fault code F01 or F02)	0013-3
11	Hydronic heater (fault code F03, F04, F05, F06, F07, F08, F09, F010)	0013-3
	TRAILER	
1	Hand brake does not engage	0014-2
2	Trailer lights do not work	0014-2
3	Trailer does not track straight when towed	0014-2
4	Tire will not hold air pressure	0014-2
5	Tongue jack assembly will not raise/lower	0014-2
6	Stabilizer leg will not raise/lower	0014-3
	SHELTER (Mechanical)	
1	Shelter/end cap will not spread while on ground	0015-2
2	Shelter/end cap will not erect	0015-2
3	Shelter/end cap will not stay erected	0015-2
4	Shelter/end cap or shelter door leaks	0015-2
5	Keepers coming out while erected	0015-2
6	Shelter/end cap has unusual shape when erected	0015-3
7	Shelter/end cap binds when coming down	0015-3
8	Shelter/end cap will not collapse completely when on ground	0015-3
9	Shelter or end cap shakes excessively	0015-3
	SHELTER (Electrical)	
1	Shelter lighting does not come on	0016-2
2	No power from PDU	0016-2
3	Power indicator lights inoperable	0016-2

END OF WORK PACKAGE

CREW TROUBLESHOOTING PROCEDURES
TMSS-MED
GENSET (ENGINE) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Personnel Required
Two

References
WP 0005, WP 0006, WP 0022, WP 0023

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the TMSS-MED by crew-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the TMSS-MED. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Table 1. Crew Troubleshooting – Genset (Engine).

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
		WARNING If Genset has been in operation, components (i.e., engine, radiator) may be extremely hot. To prevent serious injury to personnel, allow sufficient time for cool down before proceeding with checks.
1	Coolant leaking	Inspect overflow bottle and hose for damage or leaking. Inspect radiator for damage or leaking. Inspect coolant hoses for proper connections, damage, or leaking. Check coolant drain valves are turned off and drain plug is secure. Contact Maintainer Maintenance.
2	Fuel leaking	**WARNING** All fuels generate explosive fumes and gases. Utilize extreme caution. Do not smoke or use open flame when in the vicinity of fuels and associated tanks, lines. Death or severe burns to the operator or damage to the equipment may result. Inspect fuel tank for damage or leaking. Inspect fuel lines for damage or leaking. Inspect fuel pump for damage or leaking. Inspect fuel filter for damage or leaking. Check fuel drain valve is turned off and drain plug is secure. Contact Maintainer Maintenance.
3	Oil leaking	Inspect oil filter for damage or leaking. Inspect oil pan for damage or leaking. Inspect oil lines and drain valves. Contact Maintainer Maintenance.

Table 1. Crew Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
4	Battery acid leaking	**WARNING** Batteries generate explosive gas during charging. Utilize extreme caution. Do not smoke or use open flame in the vicinity of the battery. Death or severe burns may result. Battery acid can be dangerous, do not touch. Death or severe burns may result. Inspect battery for cracks or other breaks. Contact Maintainer Maintenance.
5	Engine does not crank	Check BATTERY SWITCH is set to ON. Check batteries for loose connections. Check for loose ground connection on engine. Check solenoid(s) and starter for loose connections. Check for low voltage. If below 24 VDC, attach generator NATO slave receptacle to vehicle and attempt to start engine (WP 0005). Contact Maintainer Maintenance.
6	Engine turns over slowly	Attach generator NATO slave receptacle to vehicle or trailer and attempt to start engine (WP 0005). If engine still starts slowly, contact Maintainer Maintenance.
7	Engine cranks but does not start	Check if EMERGENCY STOP button pushed in. Reset. Check for fuel supply valve set to proper operating mode (WP 0005). Reset. Check actuator and diesel speed sensor connections. Check for fuel. Check fuel level in fuel tank. Add fuel and restart engine (WP 0005). Contact Maintainer Maintenance.
8	Engine cranks but does not start (ambient temperature below 32°F (0°C))	Check if EMERGENCY STOP button pushed in. Reset. Check for fuel supply valve is set to proper operating mode (WP 0005). Reset.

Table 1. Crew Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
8 (cont.)		Set ENGINE switch to PREHEAT for approximately 30 seconds. Restart. Check fuel level in fuel tank. Add fuel and restart engine (WP 0005). Set ENGINE HEATER (hydronic) and FUEL LINE HEATER switches to on (UP) (WP 0006). Contact Maintainer Maintenance.
9	Engine stops (no warning lights)	Check if EMERGENCY STOP button pushed in. Reset. No fuel. Refill fuel tank, Set CB1 – CB5 OFF and remove load. Turn ENGINE switch to OFF then to START to restart engine (WP 0005). Contact Maintainer Maintenance.
10	Engine stops (HIGH COOLANT TEMP warning light on)	**WARNING** If coolant is not visible in radiator, let the engine cool down then restart engine and add coolant while the engine is running. Engine overheating due to lack of coolant. Refill radiator to 1" and overflow bottle to proper level of 1/3 to 1/2 full (WP 0022). Turn ENGINE switch to OFF then to START to restart engine and check warning light (WP 0005). Re-circulated exhaust gas or engine air. Reposition trailer for better circulation. Turn ENGINE switch to OFF then to START to restart engine and check warning light (WP 0005). Obstructed air inlets or exhausts. Clear air inlets and exhausts. Turn ENGINE switch to OFF then to START to restart engine and check warning light (WP 0005). Overloaded engine. Reduce load on engine. Turn ENGINE switch to OFF then to START to restart engine and check warning light (WP 0005). Contact Maintainer Maintenance.
11	Engine stops (LOW OIL PRESSURE warning light on)	Engine shutdown due to low oil pressure. Check and refill engine oil (WP 0022). Turn ENGINE switch to START to restart engine. Check warning light (WP 0005). Contact Maintainer Maintenance.

Table 1. Crew Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
12	Engine stops (OVERSPEED warning light on)	Check for fuel. Refill fuel tank. Turn ENGINE switch to OFF then to START to restart engine (WP 0005). Contact Maintainer Maintenance.
13	Excessive carbon deposits appear on exhaust outlet	**WARNING** If Genset has been in operation, exhaust system (pipes, muffler, spark arrestor) may be extremely hot. To prevent serious injury to personnel, allow sufficient time for cool down before proceeding. Engine operating without sufficient load. Perform the following: • Add additional load to the engine by turning on the ECU and operating at minimum 50% load for 4 hours. Obstructed exhaust system. Perform the following: • Check that exhaust pipe outlet is not clogged or blocked. • Check that an exhaust pipe is not broken. • Check rain cap for proper function. Obstructed air inlet system. Perform the following: • Check that air filter inlet is not blocked. • Check that air filter is not clogged. Contaminated fuel. Contact Maintainer Maintenance. Contact Maintainer Maintenance.
14	Engine emits excessive smoke	Ensure FUEL SUPPLY switch is placed fully in proper position. Contact Maintainer Maintenance.
15	DC VOLT Meter reads below 28 VDC while Genset is running	Contact Maintainer Maintenance.
16	Engine temperature remains below 120°F (48.88°C)	Contact Maintainer Maintenance.
17	AC KILOWATTS meter reads 0 with Genset under load	Contact Maintainer Maintenance.
18	Engine temperature above 220°F on COOLANT TEMP gauge (104.4°C), engine still running	**NOTE** At high ambient temperatures the COOLANT TEMP gauge temp can read 230° F (110°C) normally.

Table 1. Crew Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
18 (cont.)	Engine temperature above 220°F on COOLANT TEMP gauge (104.4°C), engine still running	Shut down system (WP 0005). Contact Maintainer Maintenance.
19	Engine oil pressure below 20 psi, engine still running	**NOTE** At high ambient temperatures the OIL PRESSURE gauge temp can read 15 psi normally. Shut down system (WP 0005). Contact Maintainer Maintenance.
		NOTE When ENGINE HEATER switch (on Genset control panel) flashes, there is a problem with the engine heater (hydronic). See Engine Heater (Hydronic) Fault Codes (Table 2) for fault codes.
20	Engine heater (hydronic) will not start (no fault code)	Check batteries are connected. Check battery switch is turned to on. Check battery voltage is above 20 VDC. If low, recharge batteries (WP 0023) or slave off vehicle. Contact Maintainer Maintenance.
21	Engine heater (hydronic) (fault code F01 or F02)	Turn ENGINE HEATER switch on Genset control panel off for 2 minutes. Check Genset fuel level, fuel Genset if necessary (WP 0005). Contact Maintainer Maintenance.
22	Engine heater (hydronic) (fault code F03)	Turn ENGINE HEATER switch on Genset control panel off for 2 minutes. Check battery voltage on DC VOLTS meter. If low, recharge batteries (WP 0023) or slave off vehicle. If voltage within 22 to 28 VDC, contact Maintainer Maintenance. Turn ENGINE HEATER switch on Genset control panel ON. Contact Maintainer Maintenance.
23	Engine heater (hydronic) (fault code F04, F05, F06, F07, F08, F09, F010)	Contact Maintainer Maintenance.

NOTE

When ENGINE HEATER switch (on Genset control panel) flashes, there is a problem with the Engine heater (Hydronic). The number of flashes indicates a specific fault code (i.e., one flash is F01, two flashes is F02).

There is a sequence of slow and fast flashes. Count the slow flashes.

Table 2. Engine Heater (Hydronic) Fault Codes.

FAULT CODE	DESCRIPTION	POSSIBLE CAUSE
F01	No Start-up	• Fuel Supply • Restricted Air Flow Through Intake or Exhaust
F02	Flame Extinguished	• Fuel Supply • Restricted Air Flow Through Intake or Exhaust
F03	Under/Over voltage	• Vehicle Charging System
F04	Premature Flame Detection	• Heater faulty
F05	Circulating Pump Interruption or Short Circuit	• Open or Shorted Wiring • Defective Pump
F06	Temperature Sensor Interruption or Short Circuit	• Heater faulty
F07	Metering Pump (Fuel pump) Interruption or Short Circuit	• Open or Shorted Wiring
F08	Combustion Fan Motor Interruption, Short Circuit, or Incorrect fan Speed	• Heater faulty
F09	Pencil Type Glow Plug/Flame Detector Interruption or Short Circuit	• Heater faulty
F10	Overheating Condition	• Coolant Flow Restriction • Circulation Pump

END OF WORK PACKAGE

CREW TROUBLESHOOTING PROCEDURES
TMSS-MED
GENSET (ELECTRICAL) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Personnel Required	References
Two	WP 0005

TROUBLESHOOTING PROCEDURES

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WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Table 1. Crew Troubleshooting – Genset (Electrical).

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
		WARNING If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow sufficient time for cool down before proceeding with checks.
1	Generator produces no voltage	Check that VOLT/AMP selector switch is properly set. Check that CB5 on circuit breaker panel is not tripped. Reset if needed and recheck voltage. Contact Maintainer Maintenance.
2	Generator produces low voltage (under no load condition)	Check that voltage is within 5 VAC of norm (208 VAC) on A-C VOLT gauge. Adjust voltage using VOLTAGE ADJUST potentiometer on Genset Control Panel. If voltage is more than ±5 VAC from norm, contact Maintainer Maintenance.
3	Generator produces low voltage (under load condition)	Check that voltage is within 5 VAC of norm (208 VAC) on A-C VOLT gauge. Adjust voltage using VOLTAGE ADJUST potentiometer on Genset Control Panel. If voltage is more than ±5 VAC from norm, contact Maintainer Maintenance.
4	Generator produces high voltage (under no load condition)	Check that voltage is within ±5 VAC of norm (208 VAC) on A-C VOLT gauge. Adjust voltage using VOLTAGE ADJUST potentiometer on Genset Control Panel. If voltage is more than ±5 VAC from norm, contact Maintainer Maintenance.
5	Generator produces high voltage (under load condition)	Check that voltage is within ±5 VAC of norm (208 VAC) on A-C VOLT gauge. Adjust voltage using VOLTAGE ADJUST potentiometer on Genset Control Panel. If voltage is more than ±5 VAC from norm, contact Maintainer Maintenance.

Table 1. Crew Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
6	Generator voltage fluctuates/wanders	Contact Maintainer Maintenance.
7	Generator frequency out of tolerance	Verify that sufficient fuel is present. Verify that there are no sudden or frequent load changes. Turn on equipment one at a time while monitoring HERTZ meter (WP 0005). If meter begins to drop, do not add any more draw to the system. Ensure that air filter is clean and is not clogged. Contact Maintainer Maintenance.
8	Generator builds voltage from start-up then goes to low voltage	Contact Maintainer Maintenance.

END OF WORK PACKAGE

CREW TROUBLESHOOTING PROCEDURES
TMSS-MED
ECU TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Personnel Required	References
Two	WP 0005

TROUBLESHOOTING PROCEDURES

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WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Table 1. Crew Troubleshooting – ECU.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
1	ECU will not run on Genset power	Ensure POWER ON light on ECU is lit indicating power available to ECU. Ensure power cable from Genset to ECU is properly connected and no apparent damage is present. Ensure Genset is running. Ensure CB1 and CB5 on Genset Circuit Breaker Panel are energized and have not tripped or need reset. Contact Maintainer Maintenance.
2	ECU will not run on shore power	**NOTE** If red light is lit, do not attempt to use shore power. Ensure POWER ON light on ECU is lit indicating power available to ECU. Disconnect shore power. Connect to Genset and operate ECU (WP 0005).
3	Voltage out of phase (red light on ECU control panel light)	Contact Maintainer Maintenance.
4	Conditioned air too cold (in Heat mode)	Ensure temperature dial on ECU control panel is set to proper temperature. Ensure MODE SELECT switch on ECU control panel is set to proper selection (WP 0005). Check for open or missing access panels on unit. If using hydronic heater, ensure AUXILIARY HEAT switch on ECU control panel is NOT flashing. Ensure ducts are attached properly and that no cuts, slits, or other damage is present allowing air to escape. Contact Maintainer Maintenance.
5	Conditioned air too warm (in Cool mode)	Ensure temperature dial on ECU control panel is set to proper temperature. Ensure MODE SELECT switch on ECU control panel is set to proper selection (WP 0005). Check for open or missing access panels on unit.

Table 1. Crew Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
5 (cont.)	Conditioned air too warm (in Cool mode)	Check that evaporator coils are not iced over. If necessary, shut down ECU (WP 0005) and allow any ice to melt. Check that condenser coils are not clogged or blocked. Ensure air filters are not clogged. Contact Maintainer Maintenance.
6	Evaporator or condenser fan does not operate	Ensure belt is properly tensioned and not loose, and that no damage is present. Contact Maintainer Maintenance.
7	Coolant leaking	Contact Maintainer Maintenance.
8	Fuel leaking	Contact Maintainer Maintenance. **NOTE** Fault code is determined by the number of times the AUXILIARY HEAT switch flashes (i.e. one flash is F01, two flashes is F02, etc.). See ECU Hydronic Heater Fault Codes (Table 2) for fault codes.
9	Hydronic heater will not start (no fault code)	Ensure POWER ON light on ECU is lit indicating power available to ECU. Ensure AUXILIARY HEAT switch is set to AUTO or MANUAL and that switch is illuminated. Contact Maintainer Maintenance.
10	Hydronic heater (fault code F01 or F02)	Set AUXILIARY HEAT switch (hydronic heater) on ECU Control Panel to OFF. Wait 2 minutes. Check Genset fuel level. If necessary, refuel (WP 0005). Attempt to re-start hydronic heater (turn AUXILIARY HEAT switch to MANUAL or AUTO). If unit fails to start after 3 attempts, contact Maintainer Maintenance.
11	Hydronic heater (fault code F03, F04, F05, F06, F07, F08, F09, F010)	Contact Maintainer Maintenance.

NOTE

When AUXILIARY HEAT switch (on ECU control panel) flashes, there is a problem with the hydronic heater. The number of flashes indicates a specific fault code (i.e., one flash is F01, two flashes is F02).

There is a sequence of slow and fast flashes. Count the slow flashes.

Table 2. ECU Hydronic Heater Fault Codes.

FAULT CODE	DESCRIPTION	POSSIBLE CAUSE
F01	No Start-up	• Fuel Supply • Restricted Air Flow Through Intake or Exhaust
F02	Flame Extinguished	• Fuel Supply • Restricted Air Flow Through Intake or Exhaust
F03	Under/Over voltage	• Vehicle Charging System
F04	Premature Flame Detection	• Heater faulty
F05	Circulating Pump Interruption or Short Circuit	• Open or Shorted Wiring • Defective Pump
F06	Temperature Sensor Interruption or Short Circuit	• Heater faulty
F07	Metering Pump (Fuel pump) Interruption or Short Circuit	• Open or Shorted Wiring
F08	Combustion Fan Motor Interruption, Short Circuit or Incorrect fan Speed	• Heater faulty
F09	Pencil Type Glow Plug/Flame Detector Interruption or Short Circuit	• Heater faulty
F10	Overheating Condition	• Coolant Flow Restriction • Circulation Pump

END OF WORK PACKAGE

CREW TROUBLESHOOTING PROCEDURES
TMSS-MED
TRAILER TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Personnel Required	References
Two	WP 0005

TROUBLESHOOTING PROCEDURES

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WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Table 1. Crew Troubleshooting – Trailer.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
1	Hand brake does not engage	Inspect brake cable(s) for damage. Adjust hand brake. Contact Maintainer Maintenance.
2	Trailer lights do not work	Verify that vehicle lights are on. Inspect inter-vehicular cable for bent pins, corrosion, or other visible damage. Check and tighten connections. Test lights. Contact Maintainer Maintenance.
3	Trailer does not track straight when towed	Improper tire pressure. Ensure both tires are properly inflated for use (20 psi - highway; 17 psi - off road). Check hand brakes are not over tightened. Contact Maintainer Maintenance.
4	Tire will not hold air pressure	Inspect tire for visible damage (cuts, holes, slices, etc.) or excessive wear. Contact Maintainer Maintenance.
5	Tongue jack assembly will not raise/lower	Ensure no dirt, rocks, sand, or other debris are present. Ensure tongue jack assembly is not at full extension or retraction (WP 0005). If so, perform the following: 1. Connect trailer to vehicle. 2. Move tongue jack assembly to center position. 3. Adjust skid plate/dolly wheel assembly so that it is within 2 to 3 inches of the ground. 4. Lift trailer off of vehicle using tongue jack assembly. Inspect crank for damage or corrosion. Inspect leg for bowing, bending, kinking, or other physical deformities that may stop tongue jack assembly from raising/lowering. Contact Maintainer Maintenance.

Table 1. Crew Troubleshooting – Trailer – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
6	Stabilizer leg will not raise/lower	Ensure stabilizer leg is not at full extension. If so, perform the following: 1. Raise stabilizer leg to fully raised position. 2. Adjust jack foot so that it is within 2 to 3 inches of the ground. 3. Lift trailer off of vehicle using tongue jack assembly. Ensure no dirt, rocks, sand, or debris is present. Inspect for corrosion. Inspect leg for bowing, bending, kinking, or other physical deformities that may stop leg from raising/lowering. Contact Maintainer Maintenance.

END OF WORK PACKAGE

CREW TROUBLESHOOTING PROCEDURES
TMSS-MED
SHELTER (MECHANICAL) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Personnel Required
Two

References
WP 0005, WP 0025, WP 0026, WP 0155, WP 0166

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the TMSS-MED by crew-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the TMSS-MED. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Table 1. Crew Troubleshooting – Shelter (Mechanical).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	Shelter/end cap will not spread while on ground	Shelter/end cap fabric is binding.	Check all fabric and release from binding point.
		Bottom hubs are catching on ground obstruction.	Check sides of shelter/end cap are not binding on ground. Clear ground area as necessary.
		Broken hub.	Replace hub (WP 0026).
		Broken strut pair.	Replace strut pair (WP 0025).
		Strut pair pulled out of hub.	Open hub and inspect hub for damage. Repair strut/hub (WP 0025, WP 0026).
2	Shelter/end cap will not erect	Shelter/end cap fabric is binding.	Check all fabric and release from binding point.
		Bottom hubs are catching on ground obstruction.	Check sides of shelter/end cap are not binding on ground. Clear ground area as necessary.
		Hub broken.	Replace hub (WP 0026).
		Broken strut pair.	Replace strut pair (WP 0025).
		Strut pair pulled out of hub.	Open hub and inspect hub for damage. Repair strut/hub (WP 0025, WP 0026).
3	Shelter/end cap will not stay erected	Shelter/end cap was not lifted to fully erect position.	Refer to (WP 0005) and review procedures.
		Shelter/end caps not properly staked.	Check shelter/end cap is properly staked.
4	Shelter/end cap or shelter door leaks	Velcro seams loose.	Check all Velcro seams to ensure that they are properly secured IAW setup procedures.
		Fabric torn.	Repair tear in fabric using field repair kit (WP 0166). If tear is greater then 10", replace shelter/end cap or shelter door (WP 0155).
5	Keepers coming out while erected	Keepers are not tight.	Tighten keeper using keeper tool from field repair kit.
			Inspect hub assembly. If hub is unserviceable, replace (WP 0026).

Table 1. Crew Troubleshooting – Shelter (Mechanical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
5 (cont.)	Keepers coming out while erected (cont.)	Keepers are not tight (cont.)	Retighten all keepers before erecting shelter. Periodically check keepers during extended operation. If keeper will not tighten due to damaged hub, contact Maintainer Maintenance.
6	Shelter/end cap has unusual shape when erected	Hub broken.	Replace hub (WP 0026).
		Broken strut pair.	Replace strut pair (WP 0025).
7	Shelter/end cap binds when coming down	Seams still attached.	Check that Velcro seams are properly separated (WP 0005).
		Doors impeding process.	Check that doors are open.
		Wind line or stake still attached.	Check that all ground stakes/ wind lines have been removed.
		Hub broken.	Replace hub (WP 0026).
		Broken strut pair.	Replace strut pair (WP 0025).
		Strut pair pulled out of hub.	Open hub and inspect hub for damage. Repair strut/hub (WP 0025, WP 0026).
8	Shelter/end cap will not collapse completely when on ground	Obstacle present.	Check that there are no obstructions present.
		Hub broken.	Replace hub (WP 0026).
		Broken strut pair.	Replace strut pair (WP 0025).
		Strut pair pulled out of hub.	Open hub and inspect hub for damage. Repair strut/hub (WP 0025, WP 0026).
9	Shelter or end cap shakes excessively	Wind lines not installed properly/loose.	Check that wind lines are properly installed and properly tightened.
		Shelter/end cap not secure/not properly staked.	Check that shelter or end cap has been staked down in accordance with set-up procedures (WP 0005).

END OF WORK PACKAGE

CREW TROUBLESHOOTING PROCEDURES
TMSS-MED
SHELTER (ELECTRICAL) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Personnel Required	References
One	WP 0005

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the TMSS-MED by crew-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the TMSS-MED. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Table 1. Crew Troubleshooting – Shelter Lighting.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
1	Shelter lighting does not come on	Check that the shelter lighting switch is turned on. Check that the shelter lighting is plugged in (WP 0005). Check that power to the shelter lighting is turned on. Contact Maintainer Maintenance.
2	No power from PDU	Check that Genset is operating properly and has not shut down. Check other legs of PDU for voltage. Rotate VOLTMETER switch between L1, L2 and L3 and observe AC VOLTS meter on PDU. Check that PDU is properly connected (WP 0005) (Genset and PDU). Check that all necessary circuit breakers are on (Genset and PDU). Verify that no one circuit has been overloaded. If necessary re-distribute load. Contact Maintainer Maintenance.
3	Power indicator lights inoperable	Check that Genset is operating properly and has not shut down. Check other legs of PDU for voltage. Rotate VOLTMETER switch between L1, L2 and L3 and observe AC VOLTS meter on PDU. Check that no circuit breakers have tripped (Genset and PDU). Reset if necessary. Contact Maintainer Maintenance.

END OF WORK PACKAGE

CHAPTER 4

CREW MAINTENANCE INSTRUCTIONS FOR TMSS-MED

CREW MAINTENANCE INSTRUCTIONS
TMSS-MED
SERVICE UPON RECEIPT

INITIAL SETUP:

Personnel Required
Two

References
WP 0005, WP 0019

GENERAL

The following procedures are required to be performed by the crew in order to prepare the shelter and its contents for use.

SITING

To ensure minimal problems with set-up of TMSS-MED and good operation of equipment being used inside TMSS-MED, ensure area is:

- Dry.
- Level with adequate room for trailer, shelter, system grounding, and all other associated equipment.
- Free of items (trees, buildings, or other structures) that would impede set-up of TMSS-MED or cause physical interference for trailer, shelter, system grounding, and all other associated equipment.
- Free of items (e.g., towers, power lines, radar, trees, buildings) that would cause interference with electronic equipment being used inside of shelter.

SHELTER REQUIREMENTS

The TMSS-MED shelter requires a footprint of 23 feet (7.01 meters) by 32 feet (9.75 meters). In addition, the TMSS-MED trailer requires a foot print of 16 feet (4.85 meters) by 7 feet (2.16 meters) for set-up and installation.

SERVICE UPON RECEIPT OF MATERIEL

Inspect each system component for damage incurred during shipment. If any damage is visible, notify supervisor. Report the damage on DD Form 361, Transportation Discrepancy Report. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with applicable service instructions.

Once all covers are removed, inspect the trailer, shelter, and each piece of equipment. Inspect all connectors, cables, and loose pieces of equipment located in the trailer cargo box. Refer to Crew PMCS (WP 0019) before placing the equipment into service.

INSTALLATION INSTRUCTIONS

The TMSS-MED requires some assembly depending upon the mode of operation. To setup the TMSS-MED in a fixed position, refer to Operation Under Usual Conditions (WP 0005) for setup and installation procedures.

PRELIMINARY SERVICING OF EQUIPMENT

Perform all Crew PMCS for the TMSS-MED as listed in Crew PMCS (WP 0019).

PRELIMINARY CHECKS AND ADJUSTMENT OF EQUIPMENT

There are no preliminary checks and adjustment of this equipment. Before placing the TMSS-MED into service, ensure all Crew PMCS (WP 0019) has been performed.

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
TMSS-MED
PMCS INTRODUCTION

GENERAL

This work package provides data necessary to keep the TMSS-MED operational ready. PMCS are performed to keep the TMSS-MED in operational condition. The checks are used to find, correct, and report problems. Maintenance personnel are required to perform the tasks as indicated in Crew PMCS (WP 0019, Table 1). PMCS are performed by the crew each time the equipment is operated. Prior to performing any maintenance that requires climbing on or under TMSS-MED, ensure cage bolts are not inserted and wheels are chocked. Injury to personnel could result from TMSS-MED suddenly rolling or tipping.

Before you begin operating the TMSS-MED and/or its equipment, perform Before PMCS.

Once a week perform Weekly PMCS. If TMSS-MED has not been operated in a week, perform Before PMCS.

Perform Monthly PMCS once a month. If TMSS-MED has not been operated in a month, perform After PMCS at the same time.

If you are operating the TMSS-MED for the first time, perform Weekly and Monthly PMCS the first time you do your Before PMCS.

If you find something wrong when performing PMCS, fix it if you can. Otherwise, notify Maintainer Maintenance.

WARNINGS AND CAUTIONS

Special attention should be paid to the WARNINGS and CAUTIONS appearing in the crew PMCS table. A WARNING means someone could be injured. A CAUTION means equipment could be damaged.

LEAKAGE DEFINITION

It is necessary for you to know how fluid leakage affects the status of the trailer. The following are definitions of the classes of leakage you need to know to be able to determine the status of the trailer. Learn these leakage definitions. When in doubt, contact Maintainer Maintenance.

CAUTION

Crews must report Class III leaks to Maintainer Level Maintenance. Failure to comply may result in damage to equipment.

NOTE

The following note applies to non-flammable liquids only. Any leakage of flammable liquid is unacceptable.

Equipment operation is allowable with minor leakages (Class I or II). Consideration must be given to fluid capacity of the item or system being checked. When Crew is in doubt, notify next level maintenance.

When operating with Class I or II leaks, continue to check fluid levels as required in your PMCS.

LEAKAGE DEFINTION – Continued

CLASS I – Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

CLASS II – Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked.

CLASS III – Leakage of fluid great enough to form drops that fall from the item being checked.

INSPECTION

Look for signs of a problem or trouble. Senses help here. You can feel, smell, hear, or see many problems. Be alert when on the TMSS-MED.

Inspect to see if items are in good condition. Are they correctly assembled, stowed, and secured, or excessively worn, leaking, corroded, or improperly lubricated? Correct any problems found or notify the next level of maintenance.

There are some common items to check all over the TMSS-MED. These include the following:

1. Bolts, clamps, nuts, and screws: Continuously check for looseness. Look for chipped paint, rust, or corrosion around bolt and screw heads and nuts. Tighten them when you find them loose. If tools are not available, Crews must notify Maintainer Level Maintenance.

2. Welds: Many items on the TMSS-MED are welded. To check these welds, look for chipped paint, rust corrosion, or gaps. When these conditions exist, Crews must notify Maintainer Level Maintenance.

3. Electrical wires, connectors, and harnesses: Tighten loose connectors. Look for cracked or broken insulation, bare wires, and broken connectors. If any are found, Crews must notify Maintainer Level Maintenance.

4. Hoses and fluid lines: Look for wear, damage, and leaks, and make sure clamps and fittings are tight. Wet spots mean a leak. A stain by a fitting or connector can also mean a leak. When you find a leak, Crews must notify Maintainer Level Maintenance.

5. Fan belts: Look for wear and damage, make sure belts are not cracked, frayed, or excessively worn. When these conditions exist, Crew must notify Maintainer Level Maintenance.

LUBRICATION SERVICE INTERVALS - NORMAL CONDITIONS

General

For safer, more trouble-free operations, make sure that your TMSS-MED is serviced when it needs it. Proper lubrication and service intervals, which are the responsibility of the Crew level maintenance, are found in this WP.

Adherence

Intervals (on-condition or hard time) and the related man-hour times are based on normal operation. The man-hour time specified is the time needed to do all the services prescribed for a particular interval. On-condition (OC) oil sample intervals shall be applied. Change the hard time interval if lubricants are contaminated or if operating the equipment under adverse operating conditions, including longer-than-usual operating hours. The calendar interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard time intervals must be applied during the warranty period.

WARNING

Cleaning solvents may be toxic and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breath vapors. Keep away from heat or flame. Never smoke when using cleaning solvent. Failure to comply may result in serious injury or death to personnel.

If personnel become dizzy while using cleaning solvents, immediately get fresh air and medical help. If cleaning solvent contacts skin or clothes, flush with cold water. If cleaning solvent contacts eyes, immediately flush eyes with water and get medical attention. Failure to comply may result in serious injury or death to personnel.

Cleaning Fittings Before Lubrication

Clean parts with cleaning solvent. Dry before lubricating.

Lubrication After Fording

If a fording operation occurs, lubricate all fittings below fording depth and check submerged gear boxes for presence of water.

Lubrication After High Pressure Washing

After a thorough washing, lubricate all grease fittings and oil can points outside and underneath trailer.

Corrosion Control

Refer to General Information (WP 0001), Corrosion Prevention and Control (CPC), for appropriate corrosion control procedures.

Hard Time Lubrication Intervals

For equipment under manufacturer's warranty, hard time lubrication intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (e.g. longer than usual operating hours, extended idling periods, extreme dust).

EXPLANATION OF TABLE ENTRIES

Item Number - Numbers in this column are for reference. When completing DA Form 2404/DA Form 5988E (Equipment Inspection and Maintenance Worksheet), include the item number for the check/service indicating a fault. Item numbers appear in the order in which the checks/services are performed for the interval listed.

Interval – This column indicates when a procedure must be performed (e.g., Before, During, After, Monthly).

Item to Be Checked or Serviced – This column indicates the item that is to be checked or serviced.

Procedure – This column describes the procedure that must be followed to ensure the equipment is capable of performing its intended mission.

Equipment Not Ready/Available If – This column lists conditions that make the TMSS-MED not fully mission-capable. If possible, fix the problem using the troubleshooting procedures and/or maintenance procedures in the manual. If this is not possible, write up the items not fixed on DA Form 2404/DA Form 5988E for Crew maintenance. For further information on how to use this form, see DA PAM 750-8.

EXPLANATION OF TABLE ENTRIES - Continued

Other Entries – Be sure to observe and annotate all special circumstances that appear/occur.

NOTE

If the equipment must be kept in continuous operation, only perform those procedures that will not disturb operation. Complete checks and services when the equipment is shut down.

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
TMSS-MED
PMCS

INITIAL SETUP:

Tools and Special Tools
Field repair kit

Personnel Required
Two

Materials/Parts
Oil (WP 0165, Items 35 and 36)
Coolant (WP 0165, Item 2)
Brake Fluid (WP 0165, Item 6)

References
WP 0020, WP 0022, WP 0024
WP 0025, WP 0026, WP 0166

Table 1. Crew Preventive Maintenance Checks and Services.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
		EVIRONMENTAL CONTROL UNIT (ECU)		
1	Before	ECU Enclosure	1. Inspect access panels for damage. Check that all latches and hinges are operational.	Cannot secure access panels.
			2. Inspect filters. Check that filters are clean and free of excessive dirt, grease, and grime.	Filters excessively dirty.
			3. Inspect supply and return ducts. Check that no damage or corrosion is present. Check that screens are free of debris.	Supply ducts ripped, torn, or otherwise damaged beyond repair. Screens are obstructed.
			4. Inspect fan blades and protective cage. Check that no damage or corrosion is present.	Fan blades/cage bent, impeding operation.
			5. Inspect evaporator fan bearings. Check that no damage or corrosion is present.	Bearings damaged, noisy, or corroded.
			6. Inspect condenser and evaporator coils. Check that no damage, leaks, or corrosion present.	Coils damaged, leaking.
			7. Inspect interior base for water build-up.	
			8. Check for missing, damaged, corroded, or loose hardware.	

Table 1. Crew Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1 (cont.)	Before	ECU Enclosure	9. Inspect condenser grill. Check that grill is not clogged or damaged and is clean and free of excessive dirt, grease, and grime.	Condenser grill is excessively dirty, clogged, or damaged.
			10. Inspect interior for fluid. If fluid is present, inspect further for loose connections or damaged hoses.	Class III coolant or lubrication leak present. Any fuel leak present. Damaged hoses or loose connections present.
2	Before	End Panel, Evaporator Assembly	1. Inspect sliding door. Check that knob is operational and is not damaged, corroded, or loose.	
			2. Inspect damper plate and damper rod. Check that items are operational and not damaged, corroded, or loose.	
			3. Inspect duct covers. Check that no rips, tears, or other damage is present.	
			4. Check for missing, damaged, corroded, or loose hardware.	
3	Before	Control Enclosure, ECU	1. Inspect panel. Check that all latches and hinges are operational.	Cannot secure access panels.
			2. Check all components (i.e., switches, knobs, meter, lens, thermostat) for damage.	Components missing or damaged.
			3. Check for missing, damaged, corroded, or loose hardware.	
4	Before	Blower Assembly	1. Check all components (i.e., blower, evaporator motor) for damage.	Components missing or damaged.
			2. Inspect belt. Check for proper tension, damage, or excessive wear.	Broken or loose belt.
			3. Check for missing, damaged, corroded, or loose hardware.	
5	Before	Heater (Hydronic)	1. Check coolant levels in reservoir. Add coolant if necessary (WP 0020).	Cannot replenish coolant.

Table 1. Crew Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
		GENSET		
6	Before	Generator, Diesel Engine	1. Inspect access panels for damage. Check that all latches and hinges are operational.	Cannot secure access panels.
			2. Check that air intake and exhaust louvers are free and clear of debris.	
			3. Inspect electronic components (i.e., switches, circuit breakers, meters, lights) on control panel(s) for damage. Check that all components are operational (no loose items, burnt out bulbs, etc.).	Components missing or damaged and renders the unit not mission capable.
			4. Inspect ground stud/cable. Check that no damage or corrosion is present.	Ground stud/cable damaged, corroded, or frayed.
			5. Inspect fuel control panel. Check lines, fuel cap, and selector switch for damaged, corroded, or missing parts.	Components missing or damaged.
			6. Inspect fuel lines for leaks at external and internal connections.	Any fuel leaks.
			7. Check fuel gauge. Verify that sufficient fuel is present for operation.	
			8. Check that frequency on HERTZ gauge is between 58 Hz to 62 Hz.	HERTZ meter not within specified range.
			9. Check for missing, damaged, corroded, or loose hardware.	
7	Before	Battery Assembly	1. Inspect battery. Check that no damage or other obvious deterioration is present to battery.	Cracked/damaged battery.
			2. Inspect battery cables. Check that connections are secure, no fraying, corrosion, or other visible damage is present.	Cables fraying, improper connections, or battery corrosion is present.
			3. Check for missing, damaged, corroded, or loose hardware.	

Table 1. Crew Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
8	Before	Engine Assembly	1. Inspect engine for missing, loose, or damaged parts. Check for wear or deterioration.	Any condition that renders the unit not mission capable.
			2. Inspect all cables and hoses for leaks, cracks, swelling, or other obvious deterioration. Check that all clamps are properly secured.	Engine leaks present. Damaged hoses, cables, or other parts.
			3. Check fluid levels. Verify that fluids (i.e., oils, coolants) are at their proper levels, no discoloration or indication of burning/overheating is present. If necessary, add oil or coolant. See (WP 0022) for proper instructions and specifications.	Low fluid, discolored fluids.
			4. Check for fuel, oil, and coolant leaks.	Any fuel leaks present. Any Class III oil or coolant leaks present.
			5. Check hydronic heater for leaks.	Any fuel leaks present. Any Class III oil or coolant leaks present.
			6. Check for missing, damaged, corroded, or loose hardware.	
9	Before	Cooling System, Engine	1. Inspect fan blades/pulley for obvious damage.	Fan blades or pulley bent or damaged.
			2. Inspect all belts for proper tension, damage, or excessive wear.	Broken or loose belts.
			3. Inspect water pump for cracks, leaks, or other damage.	Water pump inoperative, damaged, or leaking.
			4. Check for missing, damaged, corroded, or loose hardware.	
10	Before	Air Intake Assembly	1. Inspect air filter.	Air filter clogged or missing.
			2. Check for missing, damaged, corroded, or loose hardware.	Hardware missing.
11	Before	Radiator Assembly	1. Inspect radiator for dents, holes, or leaks.	Radiator assembly damaged/leaking.
			2. Inspect hoses for cracks, swelling, or other obvious deterioration.	Hoses cracked, swollen, damaged, or leaking.

Table 1. Crew Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
11 (cont.)	Before	Radiator Assembly	3. Inspect overflow bottle for cracks, leaks, or other obvious deterioration.	Class III leaks.
			4. Inspect hose clamps. Verify that clamps are secure and that no damage or other obvious deterioration is present.	Clamps loose or damaged.
			WARNING Ensure radiator is fully cooled. Hot coolant could erupt into crew's face and cause severe injury.	
			5. Check coolant level. Verify that fluid in overflow bottle is 1/3 to 1/2 full and no discoloration or indication of burning/overheating is present. If necessary, add coolant to reservoir. See (WP 0022) for proper instructions and specifications.	
			6. Check for missing, damaged, corroded, or loose hardware.	
12	Before	Exhaust Assembly	1. Inspect muffler and exhaust pipes for dents, holes, or leaks.	Muffler/exhaust pipes damaged/leaking.
			2. Inspect clamps. Check that clamps are secure and that no damage or other obvious deterioration is present.	Clamps loose or damaged.
			3. Check for missing, damaged, corroded, or loose hardware.	
		TRAILER		
13	Before	Chassis, Trailer Assembly	1. Inspect all exterior surfaces. Ensure that they are free and clear of loose debris.	
			2. Inspect parking brakes. Ensure that both parking breaks are engaged.	Parking brakes will not engage.
			3. Inspect wheel chocks. Ensure that they are present and in proper location.	

Table 1. Crew Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
13 (cont.)	Before	Chassis, Trailer Assembly	4. Inspect wheels and tires for damage, foreign objects, loose or missing lug nuts, or unusual tread wear. Remove any stones from between the treads.	Wheels/tires damaged, extreme wear, lug nuts missing/not properly tightened. Tires are unserviceable.
			5. Check tires for correct pressure: Highway: 20 psi Off Road: 17 psi	Tires will not hold air.
			6. Inspect lift rings for insecure mounting, damaged, corroded, or loose hardware.	
			7. Check that the following accessories are not missing: a. Sledge Hammer (in cabinet) b. Ground Rods c. Fire Extinguisher	Ground rods/fire extinguisher missing.
			8. Inspect inter-vehicular cable to ensure it is in good condition, the cable/connector is complete and secured in its mounting clip, and cable is not damaged/corroded.	Inter-vehicle cable/connector damaged or corroded.
			9. Inspect lunette ring for insecure mounting, damaged, corroded, or loose hardware.	Lunette ring loose, corroded, or missing.
			10. Inspect safety chains for insecure mounting, damaged, corroded, or loose hardware.	Safety chains loose, damaged, corroded, or missing.
			11. Inspect brake systems hoses and fittings. Check under vehicle for signs of brake fluid leaks. If necessary, add brake fluid as described in (WP 0022).	Brake system hoses leaking, damaged, or missing.
			12. Inspect all mounting brackets for broken fittings, damaged, corroded, or loose hardware.	
			13. Inspect ground stud/cable. Check that the ground is properly installed, connections are tight, and that no damage, fraying, or corrosion is present.	Ground stud/cable loose, corroded, fraying, or missing.

Table 1. Crew Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
13 (cont.)	Before	Chassis, Trailer Assembly	14. Check for missing, damaged, corroded, or loose hardware.	
14	Before	Stop Light, Vehicular	1. Inspect for missing or damaged lens lights or loose hardware.	
			2. Inspect electrical cables for damage or fraying.	Cables damaged, frayed, or inoperative.
15	Before	Tongue Jack Assembly	1. Inspect condition of skid plate/dolly wheel assembly for proper mounting to landing post or tongue jack.	Skid plate/dolly wheel tongue jack missing, inoperative, or shows signs of structural damage.
			2. Inspect crank handle for proper operation. Check that no corrosion is present on mechanism.	Crank handle damaged, missing, or inoperative.
			3. Check for missing, damaged, corroded, or loose hardware.	
		SHELTER		
16	Before	Shelter	1. Inspect all keepers for physical damage. Keepers should be snug and not easily turned. Replace if necessary using field repair kit (WP 0026).	Exterior keepers missing.
			2. Inspect shelter floor for punctures, tears, separated seams, or other visible damage.	
			3. Inspect all visible hubs and hub extensions for breaks, cracks, or displacement.	
			4. Inspect all wind lines for cuts, fraying, or other visible damage.	
			5. Inspect all stakes and stake plates for physical damage.	
			6. Inspect cinch belts for cuts, fraying, or other visible damage.	
			7. Inspect all visible struts for breaks, cracks, or other visible damage. Repair if necessary using field repair kit (WP 0025).	Shelter will not stay erected.

Table 1. Crew Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
17	Before	Shelter, End Cap	1. Inspect end cap covers (interior and exterior) for punctures, tears, separated seams, or other visible damage. Repair, if necessary, using field repair kit (WP 0024). 2. Inspect doors (interior and exterior) for punctures, tears, separated seams, or other visible damage. Repair if necessary using field repair kit (WP 0024). 3. Inspect all visible struts for breaks, cracks, or other visible damage. Repair if necessary using field repair kit (WP 0025). 4. Inspect all visible hubs and hub extensions for breaks, cracks, or displacement. 5. Inspect cinch belts for cuts, fraying, or other visible damage.	End cap will not stay erected.
18	Before	Shelter, Roof, and Sides	1. Inspect covers (interior and exterior) for punctures, tears, separated seams, or other visible damage. Repair if necessary using field repair kit (WP 0024). 2. Inspect all visible struts for breaks, cracks, or other visible damage. Repair if necessary using field repair kit (WP 0025). 3. Inspect riser struts for breaks, cracks, or other visible damage.	Shelter will not stay erected.
		POWER DISTRIBUTION UNIT (PDU)		
19	Before	PDU	1. Inspect overall unit for damage. 2. Inspect all circuit breakers. Verify that all are operational and no damage is present. 3. Inspect all outlets. Verify that no visible damage is present.	

Table 1. Crew Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
19 (cont.)	Before	PDU	4. Check that connectors are secure, no fraying, corrosion, or other visible damage is present. 5. Check for missing, damaged, corroded, or loose hardware.	
		LIGHT SET, SHELTER		
20	Before	Light Set	1. Inspect overall unit for damage. 2. Inspect lamps. Verify that no visible damage is present. 3. Inspect electrical connection. Ensure that connection is secure, no corrosion or other visible damage is present. 4. Check for missing, damaged, corroded, or loose hardware.	
21	Before	Wiring Kit, Electrical	1. Inspect electrical cables. Ensure that no fraying or other visible damage is present. 2. Inspect electrical connectors. Ensure that connection is secure, no corrosion or other visible damage is present. 3. Check for missing, damaged, corroded, or loose hardware.	
		ECU	**NOTE** The following items are located on the ECU control panel located behind the access door.	
22	During	Power indicator light (POWER ON)	Verify that POWER ON light is illuminated.	No power to ECU.
		Phase indicator light (OUT OF PHASE)	Verify that OUT OF PHASE light is NOT illuminated.	OUT OF PHASE light illuminated.

Table 1. Crew Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
22 (cont.)	During	Hour meter (HOURS 1/10)	Verify that hour meter is operational.	
		Auxiliary heat switch (AUXILIARY HEAT)	Verify that AUXILIARY HEAT switch light is NOT flashing.	
		GENSET		
			NOTE The following items are located on the Genset control panel located on the curbside of the Genset.	
23	During	AC Ammeter (A-C AMPERES)	Verify that AC ammeter does NOT exceed 60 amps.	
		Frequency meter (HERTZ)	Verify that frequency meter reads 60 Hz ±2% (1.2 Hz).	Frequency cannot be adjusted within tolerance.
		Wattmeter (A-C KILOWATTS)	Verify that wattmeter does NOT exceed 18 kW.	
		AC Voltmeter (A-C VOLTS)	Verify that AC voltmeter reads 208 VAC.	AC voltage cannot be adjusted to 208 VAC.
		DC Voltmeter (D-C VOLTS)	Verify that DC voltmeter reads between 26 VDC – 31 VDC. Green area on meter is 24 VDC to 31 VDC.	
		Temperature Gauge (COOLANT TEMP)	Verify that temperature gauge reads between 170°F – 200°F (76.66°C-93.33°C).	Temperature gauge exceeds 200°F (93.33°C).
		Hour meter (HOURMETER)	Verify that hour meter is operational.	Hour meter is non-operational.
		Oil Pressure Gauge (OIL PRESSURE)	Verify that oil pressure gauge reads 20 to 55 psi.	Oil pressure gauge falls below 20 psi.
		Battery Charger Ammeter (BATTERY CHARGER AMPS)	Verify that battery charger ammeter reads: Normal – 0 amps. If battery is being charged via the 120 VAC battery charger, ammeter should read: 0 to 5 amps.	Non-operational.

Table 1. Crew Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
23 (cont.)	During	Ammeter – Voltmeter selector switch (VOLT/AMP)	Rotate switch (L1-L2, L2-L3, L3-L1). Each time review readings on AC voltmeter (A-C VOLTS) and AC ammeter (A-C AMPERES). If necessary adjust VOLTAGE ADJUST potentiometer.	
		Panel light switch (PANEL LIGHT)	Rotate switch to illuminate panel lights. Switch should return to normal position upon release.	
		High Coolant Temperature indicator light (HIGH COOLANT TEMP)	Push light to test for operational status.	HIGH COOLANT TEMP light is on and remains illuminated. Indicates that temperature is over 200°F. Engine must be shut down.
		Over Speed indicator light (OVERSPEED)	Push light to test for operational status.	OVERSPEED indicator light is on and remains illuminated. Engine must be shut down.
		Low oil-pressure indicator light (LOW OIL PRESSURE)	Push light to test for operational status.	LOW OIL PRESSURE indicator is on and remains illuminated. Engine must be shut down.
		Voltage adjust potentiometer (VOLTAGE ADJUST)	Rotate potentiometer clockwise/counter-clockwise. AC voltmeter (A-C VOLTS) should fluctuate with adjustment.	A-C VOLTS meter fluctuates. Change phases on VOLT/AMP switch and verify that potentiometer is bad.
		Indicator lamps	**NOTE** The following items are located on the Genset Power Distribution Panel located on the curbside of the Genset. The following applies to the indicator lights for connectors J1 through J5 (AC voltage) of Genset power distribution panel. J6 (+28 VDC) does not have a indicator light.	

Table 1. Crew Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
23 (cont.)		Indicator lamps	Push light to test for operational status on old version PDP only.	Indicator light does not illuminate during test.
			Swivel black out cover to check operational status. On new version PDP only.	Contact Maintainer Maintenance if lamp not illuminated.
		PDU		
24	During	Voltmeter select switch	Rotate switch. Each time review readings on voltmeter on PDU.	
		TRAILER		
25	After	Fuel tank	If the Genset will be non-operational for more than 120 days, run Genset until ½ - inch of fuel is left in tank and drain tank.	Old fuel, sludge, and/or water in fuel tank.
26	After	Trailer/ECU/Genset	Perform visual inspection of trailer, Genset, ECU for fuel, oil, coolant, and other leaks.	Class III leaks found.

CAUTION

The items listed in the following table need to be performed when the Genset is in an operational status with no load on Genset.

Table 2. Crew Functional Checks and Services.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1	Weekly	Engine selector switch (ENGINE)	Rotate switch through each setting verifying that switch is fully functional.	Any function on the ENGINE switch does not operate properly.
2	Weekly	Battle short switch (BATTLE SHORT)	Flip up red cover and engage BATTLE SHORT switch. Place Genset in an operational status. Attempt to power down generator.	Genset shuts down. BATTLE SHORT switch bad.
3	Weekly	Emergency shut down switch (EMERGENCY)	Place Genset in an operational status. Attempt to power down generator with emergency shut-down switch.	Genset DOES NOT shut down. EMERGENCY switch bad.

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET – BULBS AND COVERS

GENERAL

This work package provides information on the removal/replacement of subassemblies for the Genset. They consist of:

- Control Panel indicator lights removal/replacement.
- Power Distribution Panel push to test indicator lights removal/replacement (on old version PDPs only).

NOTE

The removal/replacement of the Power Distribution Panel push to test indicator lights are for the old version only. For new version, refer to Maintainer Maintenance (WP 0071).

If necessary, refer to Controls, Indicators, and Connectors of the Genset (WP 0004).

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

CONTROL PANEL / POWER DISTRIBUTION PANEL INDICATOR LIGHTS REMOVAL/REPLACEMENT

INITIAL SETUP:

Materials/Parts
Lamp, incandescent
Lamp, LED, red

Personnel Required
One

References
WP 0005, WP 0074

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

PANEL LIGHTS

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF. Refer to Genset Shut Down Procedure (WP 0005).
2. Undo access panel latches and open.
3. Remove and retain panel light (Figure 1, Item 2).
4. Remove and properly discard incandescent bulb (Figure 1, Item 1).

END OF TASK

REPLACEMENT

1. Align incandescent bulb (Figure 1, Item 1), insert and rotate until seated.
2. Insert panel light (Figure 1, Item 2) and tighten.
3. Start Genset in accordance with Genset Start Procedure (WP 0005) and test light to ensure proper operation.
4. Close access panel.

END OF TASK

MALFUNTION/WARNING LIGHTS

NOTE

The following procedure for the Power Distribution Panel lights is only applicable to the old version push to test lights (Figure 1, Items 5 and 6).

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Undo access panel latches and open.
3. Remove and retain indicator light (Figure 1, Items 3 or 6).
4. Remove and discard LED (Figure 1, Items 4 or 5).

END OF TASK

REPLACEMENT

1. Align LED (Figure 1, Items 4 or 5), insert and rotate until seated.
2. Insert indicator light (Figure 1, Items 3 or 6) and tighten.
3. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM and test light to ensure proper operation.
4. Close access panel.

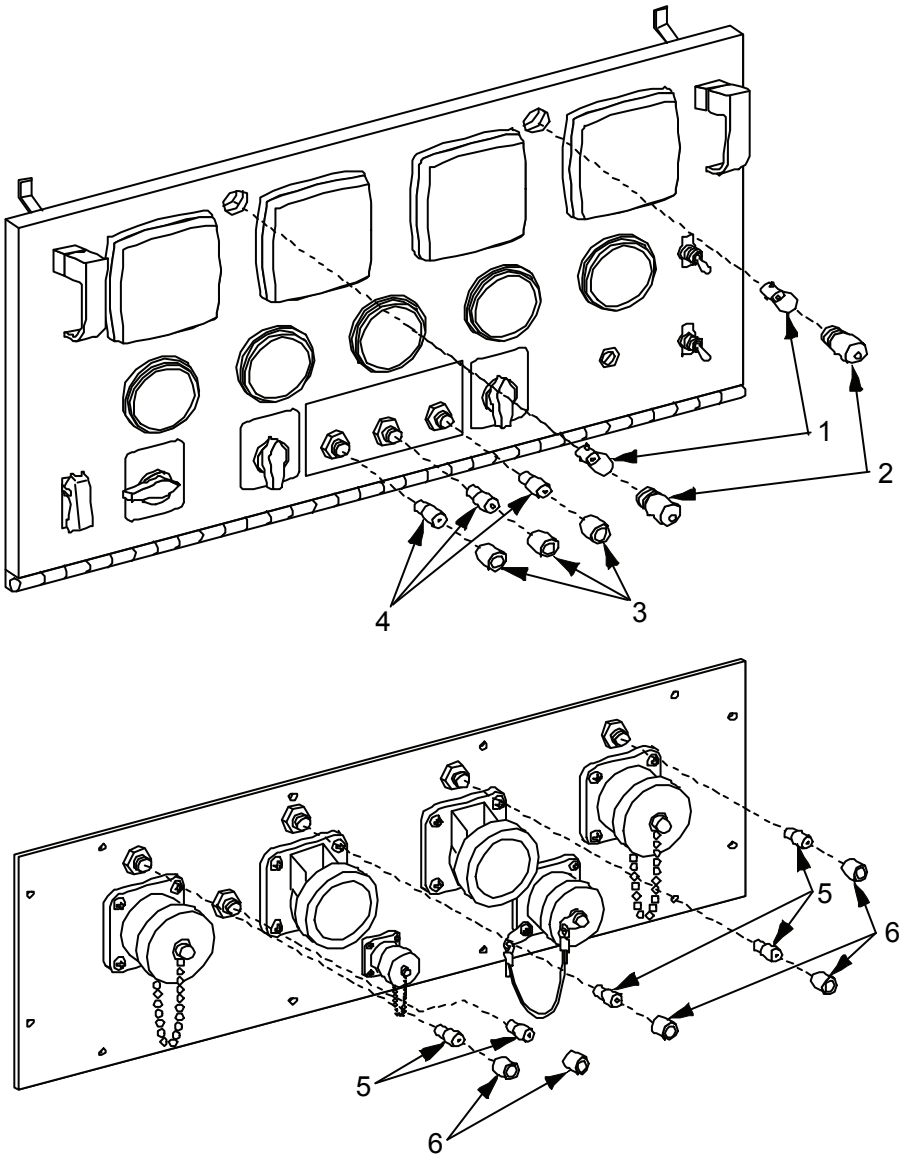

Figure 1. Control Panel and Power Distribution Panel Indicator Lights Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
TMSS-MED
FLUIDS

GENERAL

This work package provides information needed by the Crew when performing the following maintenance procedures on the TMSS-MED trailer and shelter.

- Add oil to engine – Service
- Add coolant to engine radiator – Service
- Add brake fluid to master cylinder – Service

WARNING

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never allowing the tool to bridge two terminals. Failure to observe this warning can result in serious injury.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing any service or maintenance.

CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU

Carbon monoxide does not have color or smell, but it can kill you. Breathing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. When there is no air movement, carbon monoxide can become dangerously concentrated. Precautions must be followed to ensure crew safety when the ECU, Genset, or any other vehicle is operated near the shelter.

Batteries generate explosive gas during charging. Utilize extreme caution. Do not smoke or use open flame in the vicinity of the battery. Death or severe burns may result.

Battery acid can be dangerous. Do not touch. Death or severe burns may result.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

ADD OIL TO ENGINE - SERVICE

INITIAL SETUP:

Tools and Special Tools
Funnel

Materials/Parts
Oil (WP 0168, Items 35 or 36)
Cloth, cleaning (WP 0168, Item 14)
Rubber gloves (WP 0168, Item 24)
Safety glasses

Personnel Required
One

References
WP 0005

Equipment Condition
Trailer parked, brakes engaged and wheels chocked
Genset Control Panel - ENGINE switch set to OFF
Genset Control Panel - BATTERY SWITCH set to OFF

SERVICE

WARNING

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

NOTE

To ensure proper engine oil level, check daily, especially before and after operation. Engine oil should be between the two marks on the dipstick. Engine oil should not smell burnt and should be of the proper color and consistency.

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Stop Procedure).
2. Remove and retain rear Genset access panel (Figure 1, Item 1).
3. Check oil level with the dipstick (Figure 1, Item 2). If oil level is low, proceed to next step. If oil level is correct insert dipstick (Figure 1, Item 2) and go to step 10.
4. Remove and retain oil filler cap (Figure 1, Item 3).

NOTE

Make sure that oil being added is the proper weight and viscosity for your environment (see Table 1). Use funnel supplied with trailer to avoid spillage.

5. Add oil to engine at filler cap (Figure 1, Item 3) and re-check the oil level.
6. Insert dipstick and install oil filler cap (Figure 1, Item 3).
7. Start Genset in accordance with Genset Start Procedure (WP 0005) and allow engine to run for a few minutes to circulate oil through engine.
8. Shut down Genset in accordance with Genset Stop Procedure (WP 0005) and allow a few minutes for the oil to settle.

SERVICE – Continued

9. Check oil level with the dipstick (Figure 1, Item 2). If oil level is still low, repeat steps 4 through 7. If dipstick (Figure 1, Item 2) indicates proper oil level, re-insert the dipstick (Figure 1, Item 2) and verify that oil filler cap (Figure 1, Item 3) is secure.

10. Wipe off any oil that has spilled. Install and latch rear access panel (Figure 1, Item 1).

11. Start Genset in accordance with Genset Start Procedure (WP 0005).

NOTE

Refer to Expendable and Durable Items (WP 0168) for NSN and other information on oil listed in table below.

Table 1. Engine Oil Recommendations.

Ambient Temperature	Mono-grade	Multi-Grade
Below 5°F (–15°C)	5W	5W/20
Between 5°F (–15°C) and 50°F (10°C)	10W	10W/30
Between 40°F (5°C) and 85°F (30°C)	20W	10W/30 or 15W/40
Above 85°F (30°C)	30W	15W/40 or 20W/40

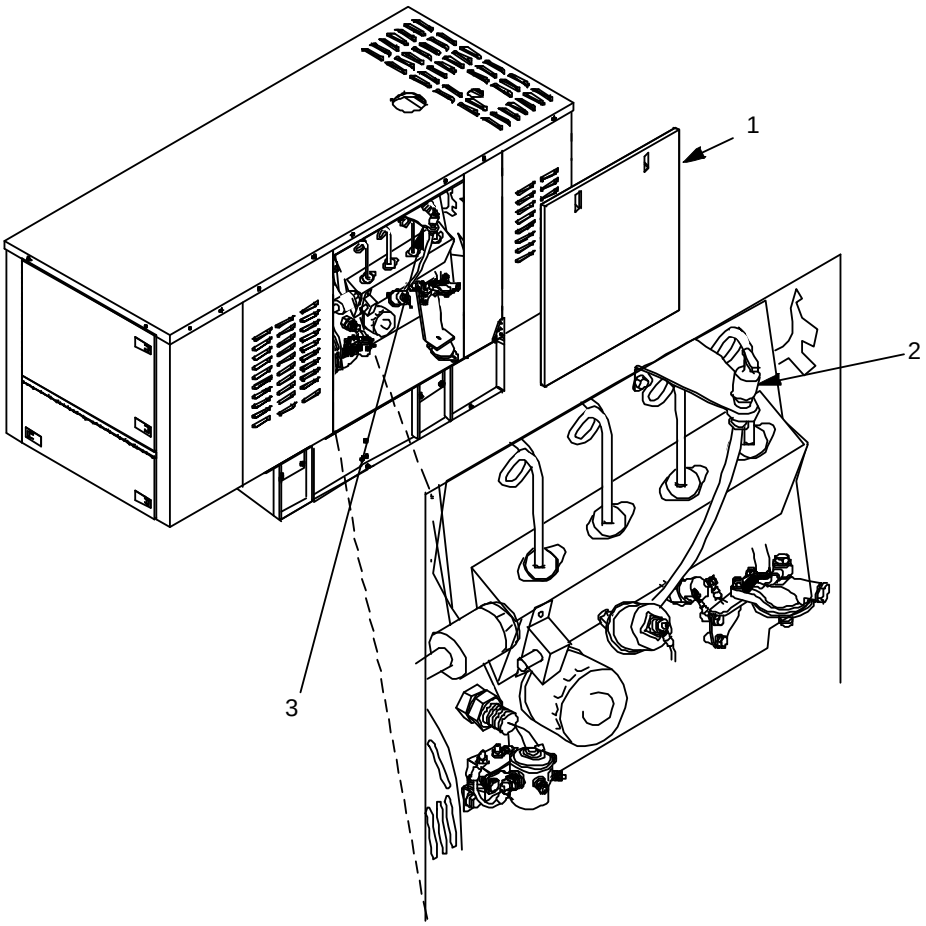

Figure 1. Oil Fill Tube and Dip Stick on Engine Location.

END OF TASK

ADD COOLANT TO ENGINE RADIATOR - SERVICE

INITIAL SETUP:

Tools and Special Tools
Funnel

Materials/Parts
Antifreeze (WP 0168, Item 2)
Cloth, cleaning (WP 0168, Item 14)
Rubber gloves (WP 0168, Item 24)
Safety glasses

Personnel Required
One

References
WP 0005

Equipment Condition
Trailer parked, brakes engaged and wheels chocked
Genset Control Panel - ENGINE switch set to set to OFF
Genset Control Panel - BATTERY SWITCH set to OFF

SERVICE

WARNING

If Genset has been in operation, the radiator and its contents may be extremely hot and coolant may spew out of radiator when cap is removed. To prevent serious injury to personnel, allow the Genset to cool down before performing the following step.

NOTE

Level of coolant in coolant bottle should be checked daily especially before and after operation. Coolant bottle should be 1/3 to 1/2 full. Coolant should also be inspected for proper color and consistency.

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Stop Procedure).
2. Remove and retain Genset access panel (Figure 2, Item 4).

NOTE

When performing the following step, if the coolant does not have the proper color or consistency then the coolant should be drained and replaced. Contact Service maintenance.

3. Check fluid level in radiator overflow bottle (Figure 2, Item 3). Fluid level in overflow bottle should be 1/3 to 1/2 full when the engine is cool.
4. If necessary, remove cap and add coolant to achieve the proper level (1/3 to 1/2 full) in radiator overflow bottle (Figure 2, Item 3).
5. Remove and retain access cap (Figure 2, Item 2) located on the top of the Genset enclosure.
6. Remove and retain radiator cap (Figure 2, Item 1) and observe coolant level. Coolant should be one inch below the overflow level.

SERVICE – Continued

NOTE

When performing the following step, use funnel provided with the trailer.

7. If required, add coolant through the access cap (Figure 2, Item 2) until proper level is obtained.
8. Install and tighten radiator cap (Figure 2, Item 1) and access cap (Figure 2, Item 2).
9. Start Genset in accordance with Genset Start Procedure (WP 0005) and allow engine to run for a few minutes to circulate coolant through engine.
10. Shut down the Genset in accordance with Genset Stop Procedure (WP 0005) and allow radiator to cool. Check coolant level in radiator overflow bottle (Figure 2, Item 3). Radiator overflow bottle (Figure 2, Item 3) should be 1/3 to 1/2 full when the engine is cool. If necessary, repeat steps 3 through 7.
11. Install and latch rear access panel (Figure 2, Item 4).
12. Start Genset in accordance with Genset Start Procedure (WP 0005).

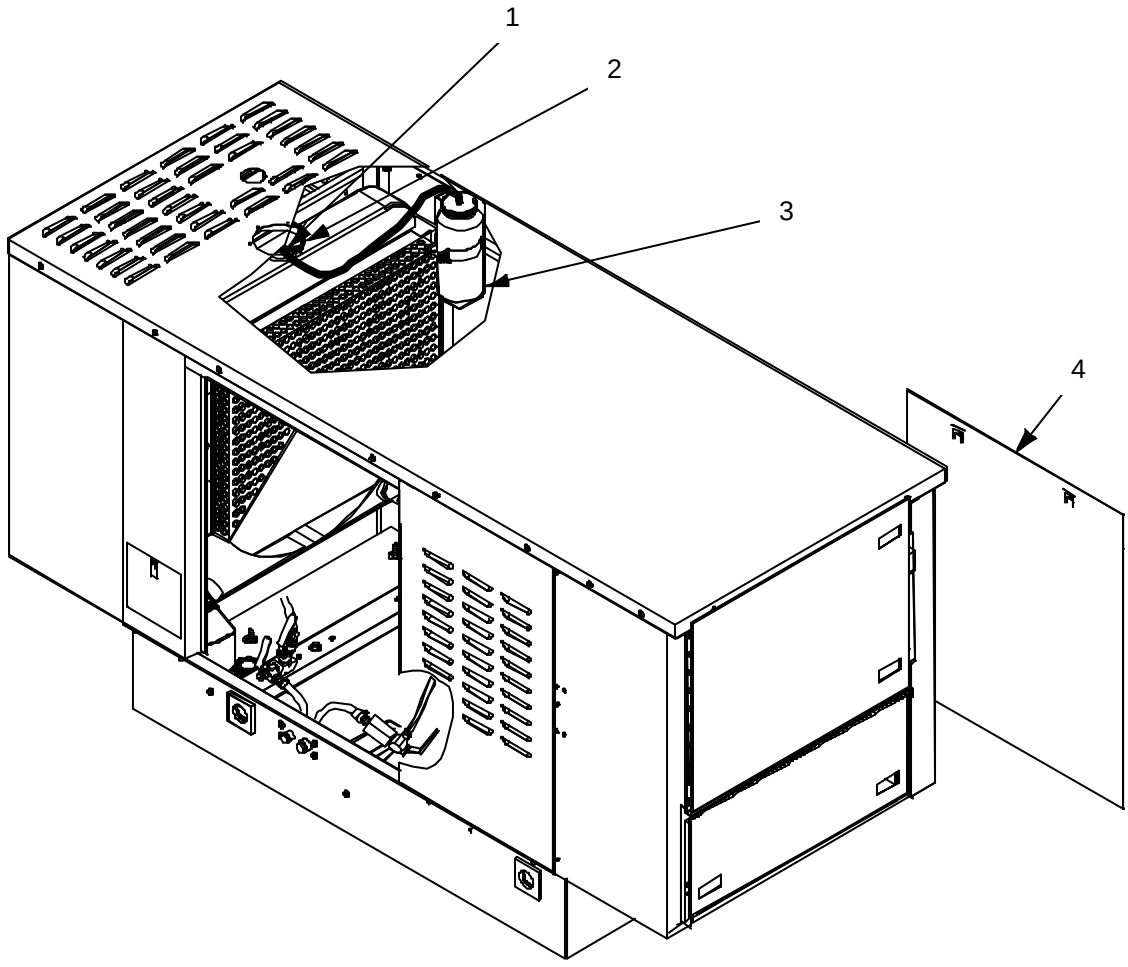

Figure 2. Location of Radiator and Radiator Overflow Bottle.

END OF TASK

MASTER BRAKE CYLINDER SERVICE

INITIAL SETUP:

Materials/Parts
DOT 3 brake fluid (WP 0168, Item 6)
Cloth, cleaning (WP 0168, Item 14)
Rubber gloves (WP 0168, Item 24)
Safety glasses

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked

CAUTION

When performing the following service, DO NOT mix brake fluid types.

SERVICE

NOTE

When master cylinder reservoir cap is removed use caution to keep debris from getting onto cap and into reservoir.

1. Remove and retain master cylinder reservoir cap (Figure 3, Item 1).

NOTE

When performing the following service, if fluid is contaminated, discolored, viscosity is incorrect, or if master cylinder reservoir is completely dry, contact next level of maintenance.

2. Inspect fluid level in master cylinder reservoir (Figure 3, Item 2). Fluid level should be approximately 3/4" from the neck of the master cylinder reservoir (Figure 3, Item 2).

3. If necessary, add brake fluid to master cylinder reservoir (Figure 3, Item 2).

NOTE

If cap does not turn smoothly remove and check threads. Forcing cap can result in damage to cap or master cylinder.

4. Replace master cylinder reservoir cap (Figure 3, Item 1) (cap should turn 1/4 turn clockwise to tighten).

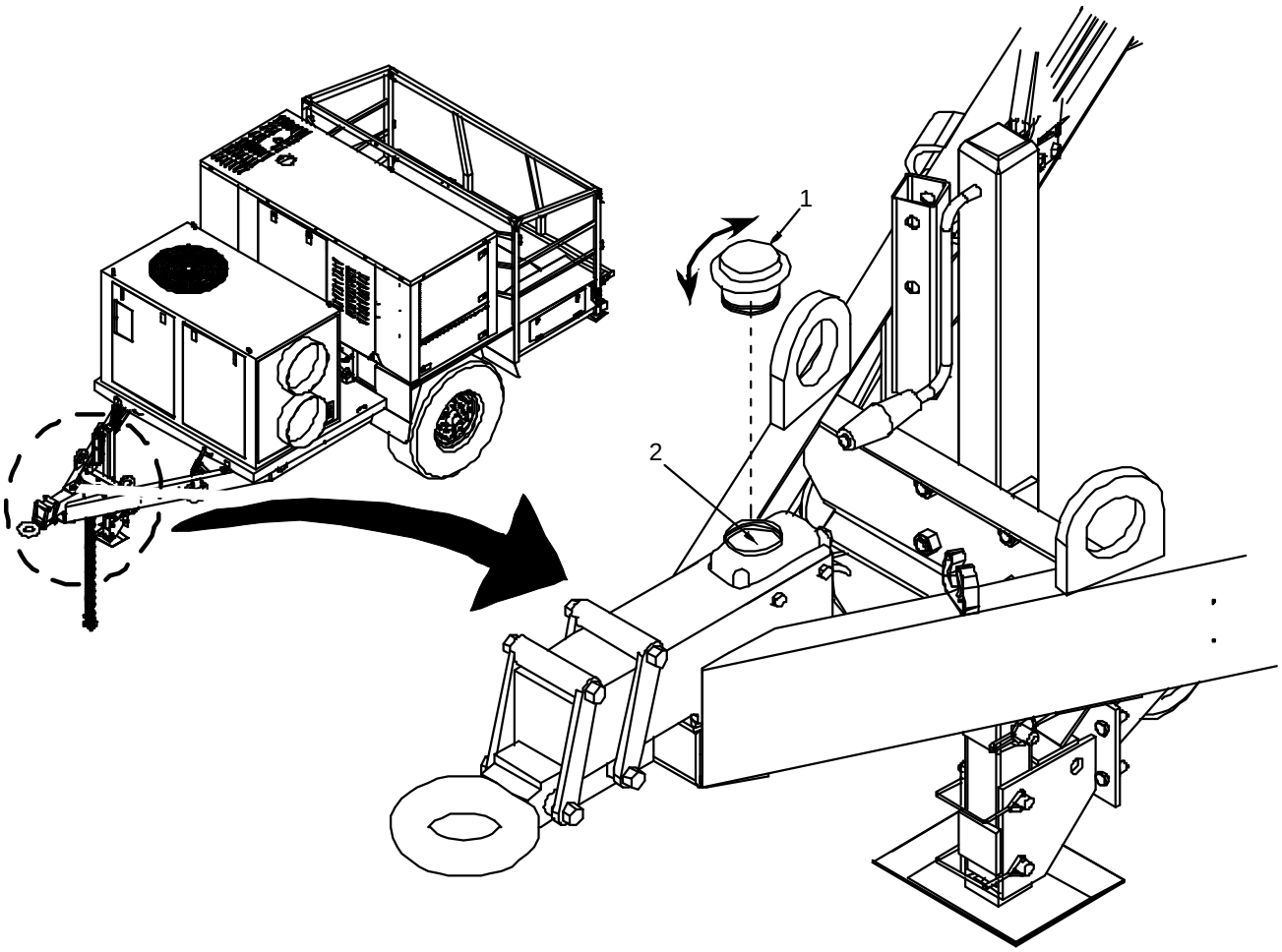

Figure 3. Master Brake Cylinder Service.

END OF TASK

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU CONTROL PANEL

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Control panel indicator POWER ON lens removal/replacement.
- Control panel indicator OUT OF PHASE lens removal/replacement.
- Check/refill ECU heater (hydronic) coolant reservoir.

If necessary, refer to Description and Use of Operator Controls, Indicators, and Connectors (WP 0004) for the controls, indicators, and connectors of the ECU.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

CONTROL PANEL INDICATOR LENS

INITIAL SETUP:

Materials/Parts
Lens, indicator, green
Lens, indicator, red

Personnel Required
One

References
WP 0005

Equipment Condition
ECU shut down

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Open ECU Control Enclosure (Figure 1, Item 1).
3. Turn indicator lens (Figure 1, Items 2 and 3) counter clockwise and remove.

END OF TASK

REPLACEMENT

1. Align indicator lens (Figure 1, Items 2 and 3) with socket.
2. Insert, apply moderate pressure, and turn clockwise until secure.
3. Close ECU Control Enclosure (Figure 1, Item 1).
4. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005).

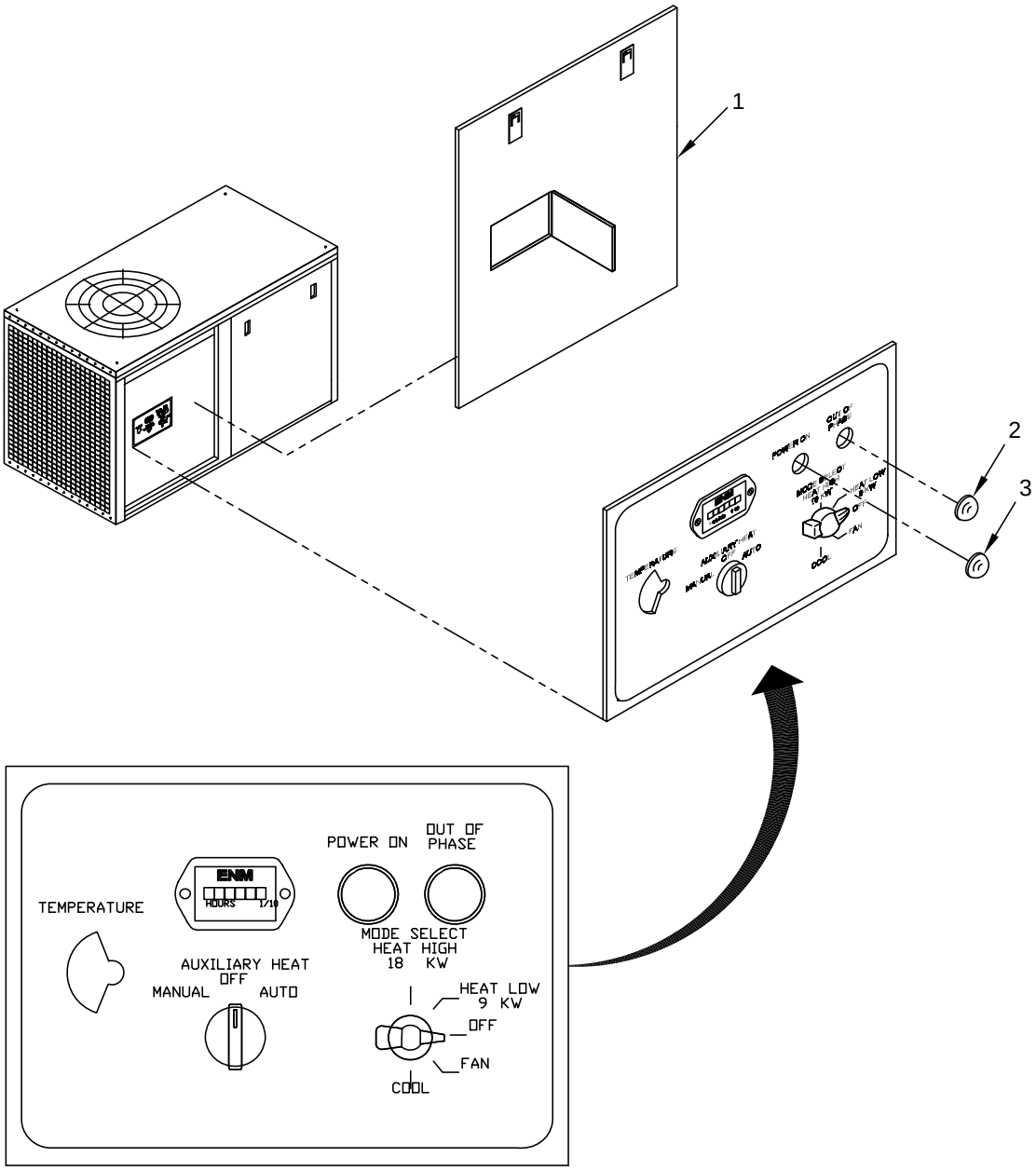

Figure 1. ECU Control Panel Lens Indicator and Mode Select Switch Knob Removal/Replacement.

END OF TASK

ECU HEATER (HYDRONIC) COOLANT RESERVOIR

INITIAL SETUP:

Materials/Parts
Coolant

References
WP 0005

Personnel Required
One

Equipment Condition
ECU shut down

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

CHECK/REFILL COOLANT

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Unlatch and remove forward access panel from ECU.
3. Turn radiator cap (Figure 2, Item 1) of ECU heater (hydronic) reservoir (Figure 2, Item 2) counterclockwise to open.
4. Check and fill reservoir (Figure 2, Item 2) as needed.

CAUTION

Do not overfill reservoir. Space must be allowed for the expansion of the heated coolant or overheating will result.

END OF TASK

REPLACEMENT

1. Install radiator cap (Figure 2, Item 1) to reservoir (Figure 2, Item 2) and turn clockwise to tighten.
2. Attach forward access panel to ECU.
3. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005).

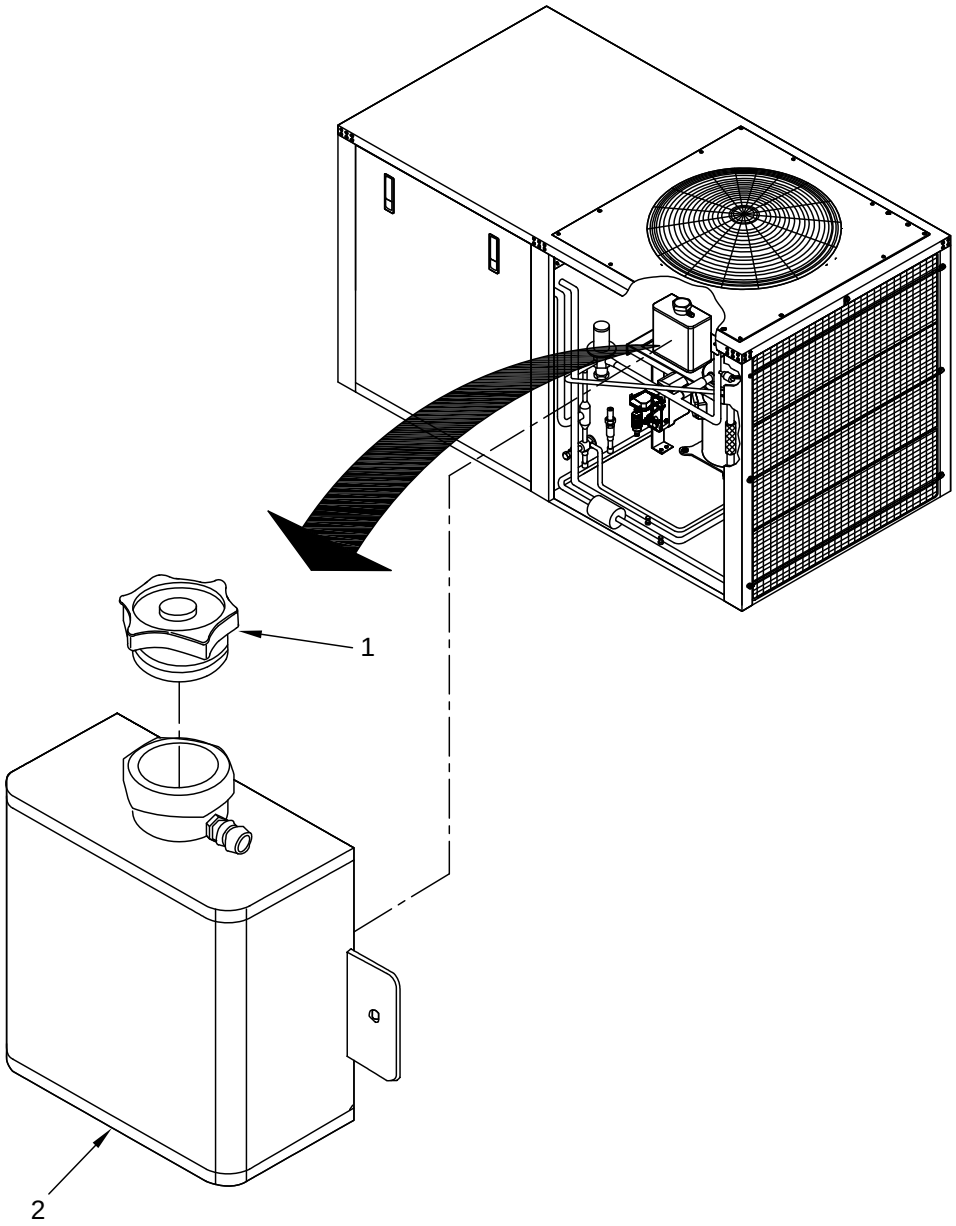

Figure 2. ECU Heater (Hydronic) Coolant Reservoir.

END OF TASK

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
TMSS-MED
ELECTRICAL

GENERAL

This work package provides information needed by the Crew when performing the following maintenance procedures on the TMSS-MED trailer and shelter.

- Charge batteries - Service
- Trailer lights/Inter-vehicular cable - Test

WARNING

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never allowing the tool to bridge two terminals. Failure to observe this warning can result in serious injury.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing any service or maintenance.

CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU

Carbon monoxide does not have color or smell, but it can kill you. Breathing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. When there is no air movement, carbon monoxide can become dangerously concentrated. Precautions must be followed to ensure crew safety when the ECU, Genset, or any other vehicle is operated near the shelter.

Batteries generate explosive gas during charging. Utilize extreme caution. Do not smoke or use open flame in the vicinity of the battery. Death or severe burns may result.

Battery acid can be dangerous. Do not touch. Death or severe burns may result.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CHARGE BATTERIES – SERVICE

INITIAL SETUP:

Materials/Parts
NATO Cable

Personnel Required
One

References
WP 0005

Equipment Condition
Trailer parked, brakes engaged and wheels chocked
Genset Control Panel - ENGINE switch set to OFF
Genset Control Panel - BATTERY SWITCH set to OFF

SERVICE

WARNING

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never allowing the tool to bridge two terminals. Failure to observe this warning can result in serious injury.

NOTE

Prior to performing the following steps, inspect the batteries and cables for any visible damage. Verify that fluid level(s) are correct. If necessary, contact Unit maintenance to check fusible link between batteries.

Battery Charging (using alternator on Genset engine)

1. Start Genset in accordance with Genset Start Procedure (WP 0005) and allow alternator to charge battery.
2. Observe DC VOLTS meter (Figure 1, Item 1) and BATTERY CHARGER AMPS meter (Figure 1, Item 2) on Genset control panel (Figure 1, Item 3). See (Table 1) for normal meter indications.
3. If battery does not charge, contact Service maintenance.

END OF TASK

Battery Charging (using 24 VDC)

NOTE

The batteries should be charged once every 6 months.

1. Connect appropriate NATO cable to 24 VOLTS DC (J6) (Figure 1, Item 5) of Genset Power Distribution Panel (Figure 1, Item 7) and to 28 VDC power source.
2. Verify that DC source is properly energized.
3. Check the indicator lamp and charge the batteries for eight hours.
4. Set ENGINE switch (Figure 1, Item 4) on the Generator Power Distribution Panel to the RUN position.

Battery Charging (using 24 VDC) - Continued

5. Observe DC VOLTS meter (Figure 1, Item 1) on Genset control panel (Figure 1, Item 3). See (Table 1) for normal meter indications. If battery does not charge (DC VOLTS meter should read between 24 to 28 VDC) after eight hours, continue charging for an additional four hours.

6. If battery does not charge after a total of 12 hours, contact Service maintenance.

END OF TASK

Battery Charging (using single phase 120 VAC)

NOTE

The batteries should be charged once every 6 months.

1. Connect battery charger cable (provided with the trailer) to 120 VOLT INPUT (J5) (Figure 1, Item 6) on the Genset Power Distribution Panel and to 120 VAC power source.

2. Verify that AC source is properly energized.

3. Check the indicator lamp and charge the batteries for eight hours.

4. Set ENGINE switch (Figure 1, Item 4) on the Generator Power Distribution Panel to the RUN position.

5. Observe DC VOLTS meter (Figure 1, Item 1) on Genset control panel (Figure 1, Item 3). See (Table 1) for normal meter indications. If DC VOLTS meter does not read between 24 to 28 VDC after eight hours, continue charging for an additional four hours.

6. If battery does not charge after a total of 12 hours, contact Service maintenance.

END OF TASK

Table 1. Normal Meter Reading for Battery.

Meter	Normal Indication	Notes
DC VOLTS	Indicator in green area meter	Green area on meter is 24 VDC to 31 VDC
BATTERY CHARGER AMPS	0 amps	If battery is being charged via the 120 VAC battery charger, the ammeter should read: 0 to 5 amps

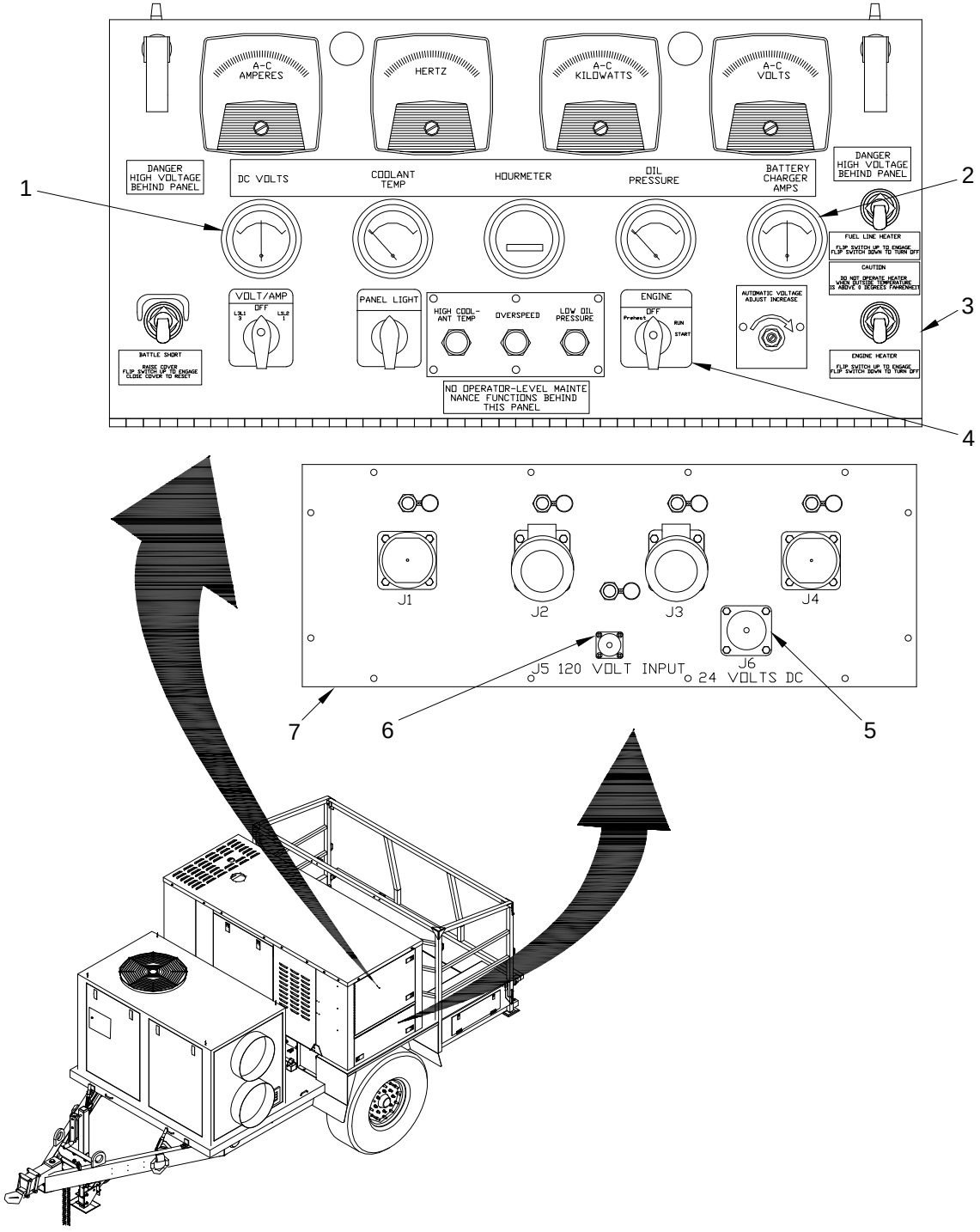

Figure 1. Location of Connectors and Meters for 24 VDC Battery Charging.

TRAILER LIGHTS/INTER-VEHICULAR CABLE - TEST

INITIAL SETUP:

Personnel Required
Two

Equipment Condition
Trailer connected to tow vehicle via inter-vehicular cable

TEST

1. Connect inter-vehicular cable assembly to tow vehicle.
2. While driver pushes down on brake pedal, observe that trailer brake lights activate.
3. While driver activates turn signals and hazard lights, observe that turn signal and hazard light on trailer activate.
4. While driver activates black-out drive lights, observe that trailer blackout lights activate.
5. If any of the above steps fail, contact Service maintenance.

END OF TASK

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
TMSS-MED
SHELTER COVER

GENERAL

This work package provides information needed by the Crew when performing the following maintenance procedures on the TMSS-MED shelter.

- Shelter – Cover repair (using field repair kit)
- Shelter – Cover removal/replacement

WARNING

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never allowing the tool to bridge two terminals. Failure to observe this warning can result in serious injury.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing any service or maintenance.

CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU

Carbon monoxide does not have color or smell, but it can kill you. Breathing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. When there is no air movement, carbon monoxide can become dangerously concentrated. Precautions must be followed to ensure crew safety when the ECU, Genset, or any other vehicle is operated near the shelter.

Batteries generate explosive gas during charging. Utilize extreme caution. Do not smoke or use open flame in the vicinity of the battery. Death or severe burns may result.

Battery acid can be dangerous. Do not touch. Death or severe burns may result.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

SHELTER - COVER REPAIR (USING FIELD REPAIR KIT)

INITIAL SETUP:

Tools and Special Tools
Field repair kit

Equipment Condition
Shelter is unpacked and spread out

Personnel Required
One to four

NOTE

The field repair kit is supplied with the shelter.

Field repair kit is intended to repair a hole or tear in a shelter cover 10" in size or less.

The following procedure can be used to repair the main shelter section, end caps, and doors.

REPAIR

1. Examine the damaged area of the interior and exterior covers (Figure 1, Item 1).

2. If necessary, remove only those keepers necessary to peel back the exterior or interior cover (Figure 1, Item 1) to reach the hole or tear (Figure 1, Item 2).

NOTE

When performing the following steps:
- Allow approximately 1/4" extra on all sides.
- If patching a small hole or tear, cut the patch into a circle.
- If the tear or hole is too large, cut the patch into an oval shape.

3. Choose matching color self adhering patch material (Figure 1, Item 3) from the repair kit. Using scissors, cut enough self adhering patch material (Figure 1, Item 3) to cover the hole or tear.

4. Peel backing off of self adhering patch material (Figure 1, Item 3) and align with hole or tear (Figure 1, Item 2).

5. Press self adhering patch material (Figure 1, Item 3) firmly over hole or tear (Figure 1, Item 2), smoothing away any air bubbles. Patch will be secured immediately.

6. If necessary, replace cover and tighten all keepers as described in this WP.

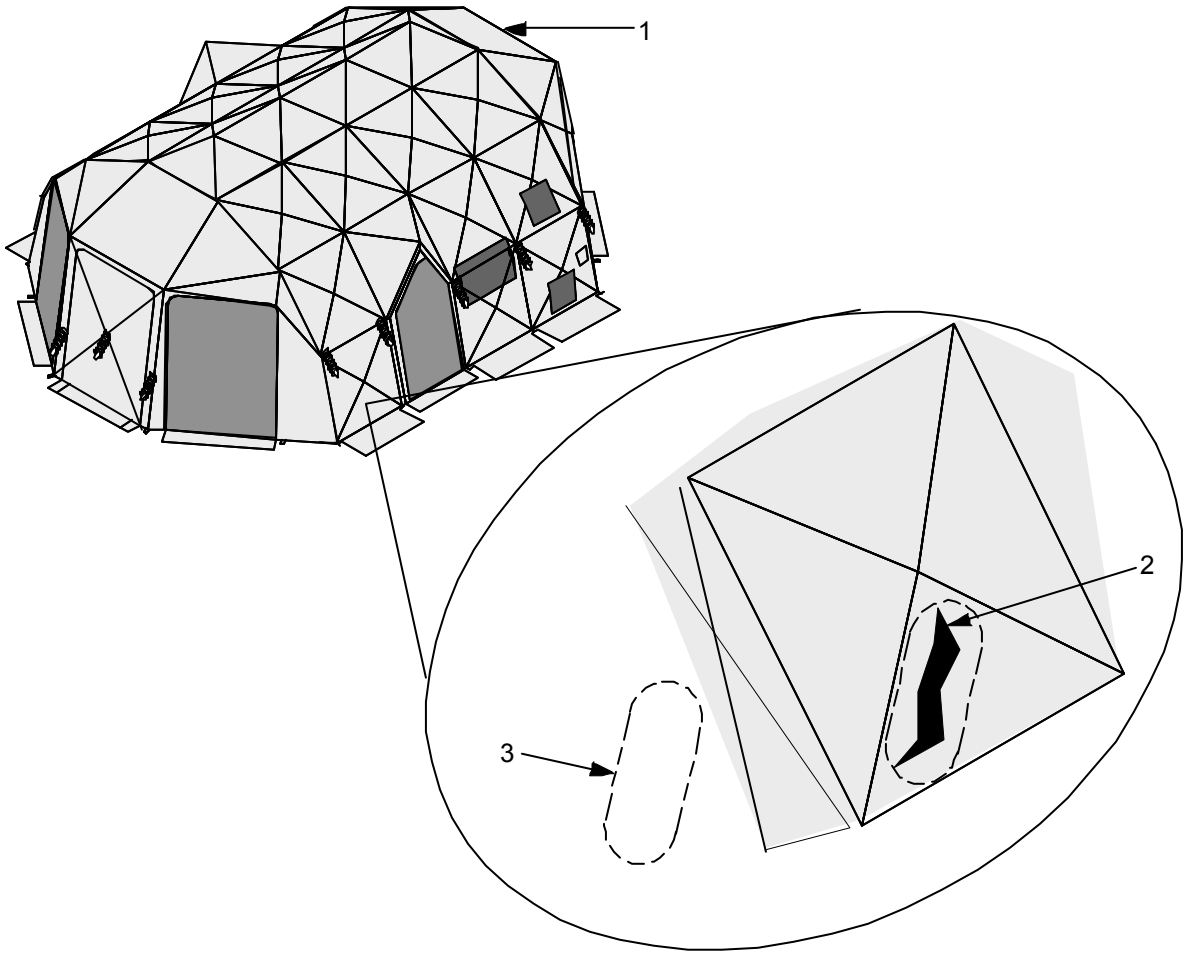

Figure 1. Repair of Shelter Cover.

END OF TASK

SHELTER COVER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Field repair kit

References
WP 0005

Materials/Parts
Cover

Equipment Condition
Shelter is unpacked and spread out

Personnel Required
Four

NOTE

The following procedures apply to main shelter and end caps.

REMOVAL

1. If necessary, strike the shelter (Figure 2, Item 2) (see WP 0005) and separate end caps (Figure 2, Item 1) from the main section.
2. Spread shelter (Figure 2, Item 2) out to full extension so that cover being replaced is face up.

CAUTION

When performing the following step, do not step on struts. Struts could become damaged or break due to weight.

NOTE

When performing the following step, inspect all keepers for damage (stripped threads, broken or frayed loop, remember to keep track of which keepers went into which holes. Looped keepers must be returned to proper location(s).

3. Using spanner wrench, remove and retain all keepers (Figure 2, Item 4).
4. Roll cover (Figure 2, Item 3) off of frame (Figure 2, Item 5).

NOTE

If removing both interior and exterior covers, continue with steps 5 and 6.

5. Compress the frame (Figure 2, Item 5).
6. Flip the shelter (Figure 2, Item 2) over. Repeat steps 2 through 4.

END OF TASK

REPLACEMENT

CAUTION

Do not step on struts. Struts could become damaged or break due to weight.

1. Spread the frame (Figure 2, Item 5) out completely.
2. Using door sections for alignment, spread cover (Figure 2, Item 3) over frame (Figure 2, Item 5).

CAUTION

NEVER use a thread-locking additive on the keepers. This will damage the threads and prevent the keeper from being removed at a later time for repairs.

NOTE

Place the keepers back into their original positions to ensure the proper placement of the looped keepers.

Keepers will screw in easily. If keeper will not screw in by hand, check to make sure the keeper is straight, and check the threads in the hub (Figure 2, Item 6) to ensure they are not damaged. If damaged, replace with a new hub.

3. Install keeper (Figure 2, Item 4) through cover (Figure 2, Item 3) located at center of bottom sides. (Identified by the stake plates attached to the hubs).
4. Roll cover (Figure 2, Item 3) (from sides) into center of frame (Figure 2, Item 5). (Cover should now be in a double roll, attached at each end to the appropriate stake plated hub).
5. Working from already attached hubs (Figure 2, Item 6), attach keepers (Figure 2, Item 4) in line with two previously attached hubs (Figure 2, Item 6) (This should result in the center of the cover attached to the frame).
6. Unroll cover (Figure 2, Item 3) over until next set of hubs (Figure 2, Item 6) are present. Align holes with frame (Figure 2, Item 5).
7. Install keepers (Figure 2, Item 4) and attach to hubs (Figure 2, Item 6).
8. Repeat until all keepers (Figure 2, Item 4) are installed being mindful of proper locations of looped keepers (Figure 2, Item 4).
9. Compress the shelter (Figure 2, Item 2) 4/5th of the way.
10. Using spanner wrench, tighten all keepers (Figure 2, Item 4).

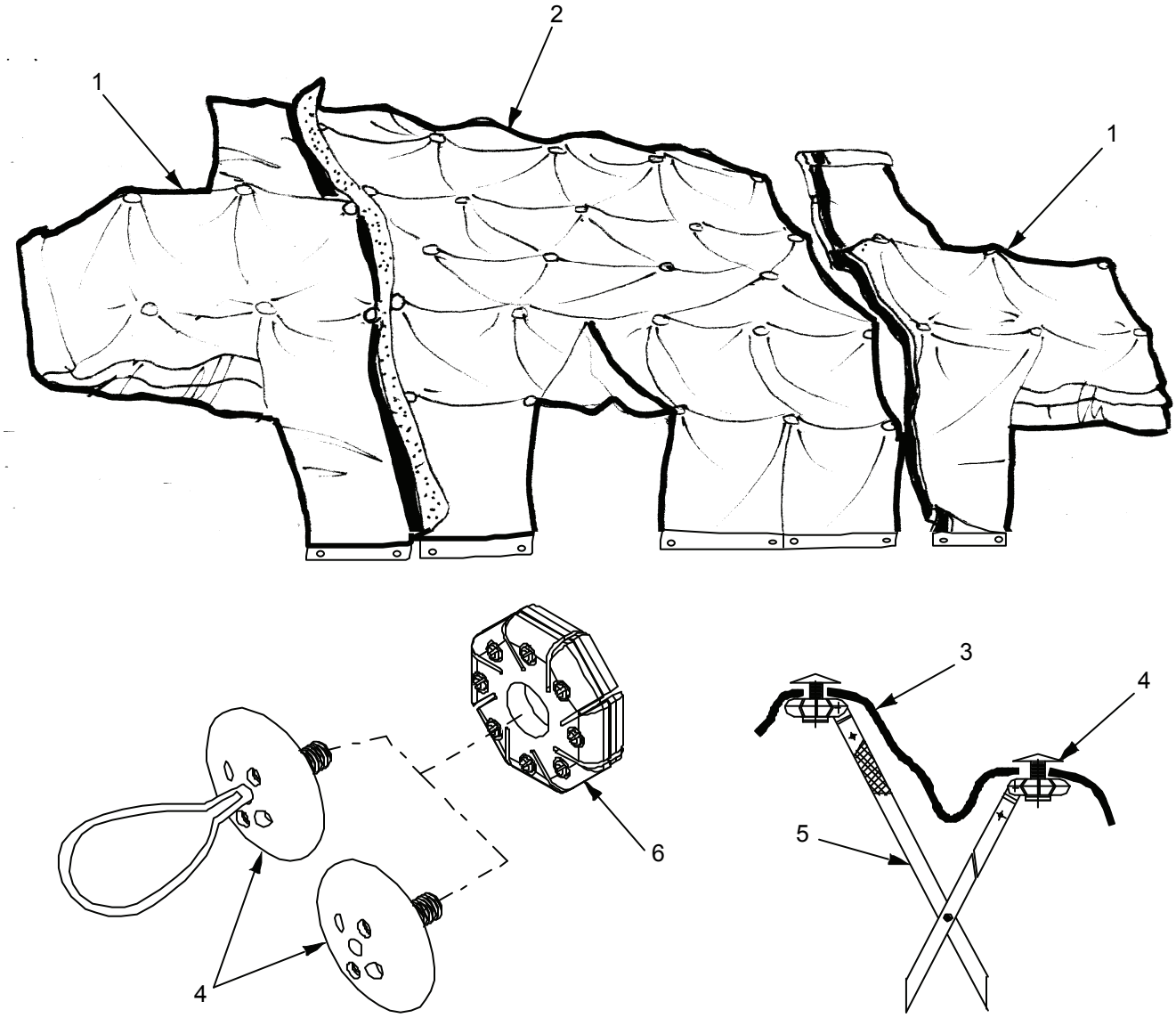

Figure 2. Shelter Cover(s) Removal/Replace.

END OF TASK

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
TMSS-MED
SHELTER STRUT

GENERAL

This work package provides information needed by the Crew when performing the following maintenance procedures on the TMSS-MED shelter.

- Shelter - strut repair (using field repair kit)
- Shelter - strut removal/replacement

WARNING

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never allowing the tool to bridge two terminals. Failure to observe this warning can result in serious injury.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing any service or maintenance.

CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU

Carbon monoxide does not have color or smell, but it can kill you. Breathing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. When there is no air movement, carbon monoxide can become dangerously concentrated. Precautions must be followed to ensure crew safety when the ECU, Genset, or any other vehicle is operated near the shelter.

Batteries generate explosive gas during charging. Utilize extreme caution. Do not smoke or use open flame in the vicinity of the battery. Death or severe burns may result.

Battery acid can be dangerous. Do not touch. Death or severe burns may result.

SHELTER – STRUT REPAIR (USING FIELD REPAIR KIT)

INITIAL SETUP:

Tools and Special Tools
Field repair kit

Personnel Required
One to four

Materials/Parts
Duct tape (WP 0168, Items 17 or 18)

Equipment Condition
Shelter is unpacked and spread out

NOTE

The following procedure can be used to repair struts for both the main shelter section and end caps.

If fractured strut(s) is found during shelter inspection, remove only the exterior cover required to gain access to damaged strut.

REPAIR

1. If necessary, remove keepers as described in this WP.
2. Peel back exterior cover to gain access to damaged strut (Figure 1, Item 1).
3. Using hack saw (provided with field repair kit) trim off 1/2" from each end of damaged strut (Figure 1, Item 1).

NOTE

The field repair kit is supplied with the shelter.

4. Retrieve repair sleeve (Figure 1, Item 2) from field repair kit.
5. Slide the repair sleeve (Figure 1, Item 2) over damaged strut (Figure 1, Item 1), keeping damaged strut (Figure 1, Item 1) centered in repair sleeve (Figure 1, Item 2).

NOTE

Tape one end ONLY of the repair sleeve (Figure 1, Item 2) with the duct tape (Figure 1, Item 3). This will allow broken strut (Figure 1, Item 1) to telescope within the repair sleeve (Figure 1, Item 2) and maintain its critical length.

6. Wrap tape around end of broken strut (Figure 1, Item 1) that is closest to the center hinge (Figure 1, Item 4). This will ensure repair sleeve (Figure 1, Item 2) does not slide into and bind the hinge.
7. Replace shelter cover.
8. Tighten all keepers as described in this WP.

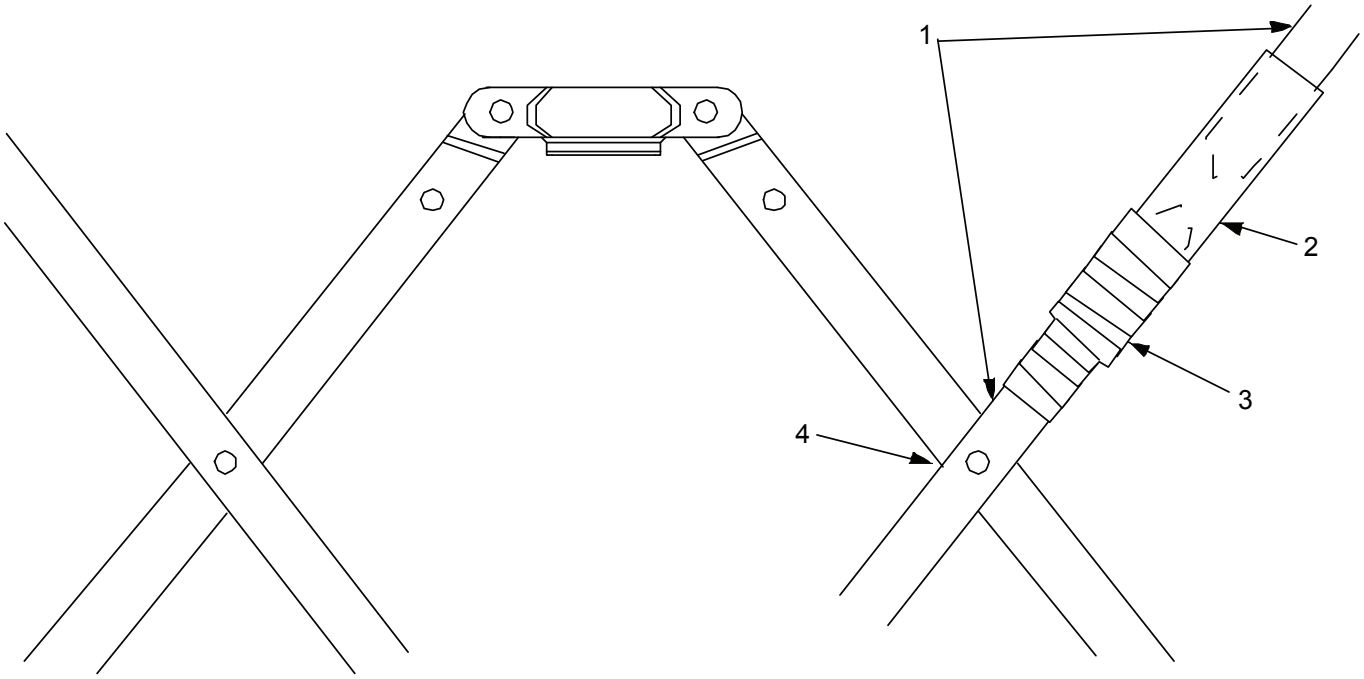

Figure 1. Repair of Shelter Strut.

END OF TASK

SHELTER STRUT REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Field repair kit

Materials/Parts
Strut

Personnel Required
One

References
WP 0005

Equipment Condition
Shelter is unpacked and spread

NOTE

The following procedures apply to main shelter and end caps.

This repair procedure can be accomplished in all weather conditions.

REMOVAL

1. If necessary, strike the shelter (Figure 2, Item 2) (see WP 0005) and separate end caps (Figure 2, Item 1).
2. Identify broken strut(s) (Figure 2, Item 4) and associated hub(s) (Figure 2, Item 7).
3. Contract frame until tension on strut(s) are reduced.

NOTE

If damaged strut(s) (Figure 2, Item 4) are located on interior of shelter, remove as much cover as is necessary to access strut(s) (Figure 2, Item 4).

Work on one strut pair at a time to prevent confusion.

4. Using spanner wrench, remove keepers (Figure 2, Item 5) holding cover (Figure 2, Item 3) to the affected hubs (Figure 2, Item 7).
5. Remove and retain eight screws (Figure 2, Item 6) from hub (Figure 2, Item 7) that secure broken strut (Figure 2, Item 4).

NOTE

When performing the following step, be observant of strut positions in hub.

6. Remove and retain top of hub (Figure 2, Item 7).
7. Remove damaged strut (Figure 2, Item 4) from the hub (Figure 2, Item 7).

NOTE

Before removing damaged strut, match new strut to old strut to ensure replacement strut is correct type.

8. Remove damaged strut(s) (Figure 2, Item 4) one at a time, being observant of color on ends.

END OF TASK

REPLACEMENT

CAUTION

Placing the strut in backwards can prevent the shelter from erecting or cause other struts to break.

NOTE

Place new strut alongside old strut and verify the strut being replaced is correct type and color.

1. Position strut (Figure 2, Item 4) and install into hub (Figure 2, Item 7).
2. Insert end hinge rod of strut (Figure 2, Item 4) into hub (Figure 2, Item 7) base.

NOTE

If multiple struts are in hub, ensure that all struts are securely seated.

3. Install top of hub (Figure 2, Item 7) and secure with eight screws (Figure 2, Item 6).
4. If necessary, repeat procedure beginning with step 4 of removal procedure until all damaged struts are replaced.
5. If necessary, install cover as described in this WP.
6. Verify proper assembly, erect shelter (as described in WP 0005).

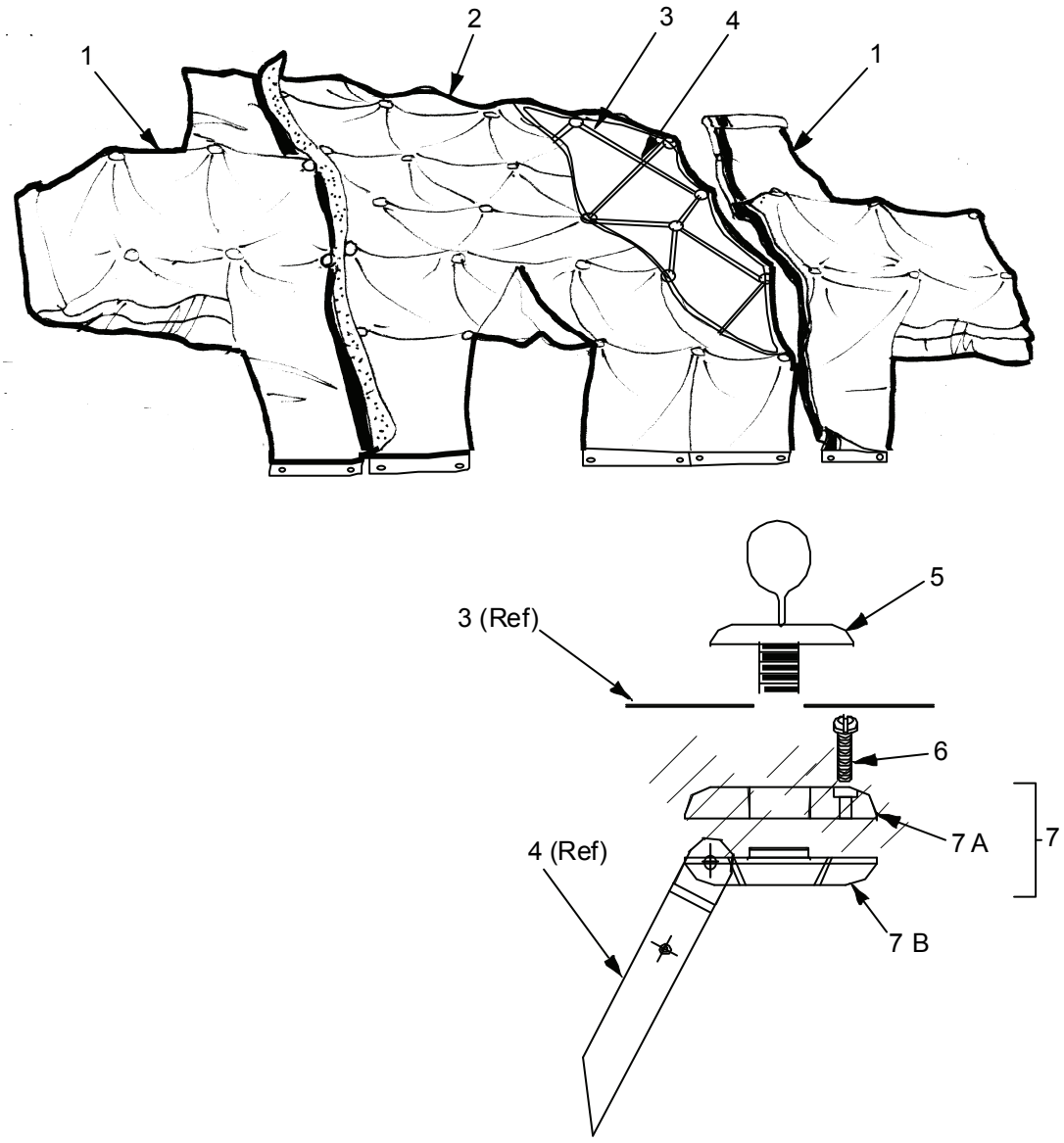

Figure 2. Shelter Struts Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
TMSS-MED
SHELTER REPAIR USING FIELD REPAIR KIT

GENERAL

This work package provides information needed by the Crew when performing the following maintenance procedures on the TMSS-MED trailer and shelter.

- Keeper - removal/replacement (using field repair kit)
- Main hub - removal/replacement
- Main Staking Bracket - removal/replacement

WARNING

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never allowing the tool to bridge two terminals. Failure to observe this warning can result in serious injury.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing any service or maintenance.

CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU

Carbon monoxide does not have color or smell, but it can kill you. Breathing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. When there is no air movement, carbon monoxide can become dangerously concentrated. Precautions must be followed to ensure crew safety when the ECU, Genset, or any other vehicle is operated near the shelter.

Batteries generate explosive gas during charging. Utilize extreme caution. Do not smoke or use open flame in the vicinity of the battery. Death or severe burns may result.

Battery acid can be dangerous do not touch. Death or severe burns may result.

KEEPER- REMOVAL/REPLACEMENT (USING FIELD REPAIR KIT)

INITIAL SETUP:

Tools and Special Tools
Field repair kit

Personnel Required
One

Materials/Parts
Keeper

Equipment Condition
Shelter is unpacked and spread out

NOTE

The following procedure can be used to replace keepers on both the main shelter section and end caps.

REMOVAL

1. Identify damaged keeper (Figure 1, Items 1 or 2).

NOTE

The field repair kit is supplied with the shelter.

2. Using spanner wrench, (provided in the field repair kit) loosen keeper (Figure 1, Items 1 and 2) and remove from hub (Figure 1, Item 4).

END OF TASK

REPLACEMENT

1. Retrieve a replacement keeper (Figure 1, Items 1 and 2) from the field repair kit. Inspect to ensure O-ring is present around base and that O-ring is not damaged.

CAUTION

NEVER use thread-locking additive on keepers. This will damage the threads and prevent the keeper from being removed.

NOTE

Inspect threads of hub (Figure 1, Item 4) and keeper (Figure 1, Items 1 and 2) to ensure they are not damaged. If damaged, contact Service maintenance to replace hub. Keeper should screw in easily. If keeper (Figure 1, Items 1 and 2) will not screw in by hand, check to make sure that keeper (Figure 1, Items 1 and 2) is straight and that cross-threading did not occur.

When performing the following step, ensure all sewn seams of shelter are aligned. Fabric reinforced circles around keepers should not be twisted.

2. Screw new keeper (Figure 1, Items 1 and 2) through shelter (Figure 1, Item 3) into the hub (Figure 1, Item 4) by hand until snug.

CAUTION

When performing the following step, do not over tighten. This could damage the threads and prevent the keeper from being removed.

3. Use the spanner wrench, tighten one-quarter turn past hand tight.

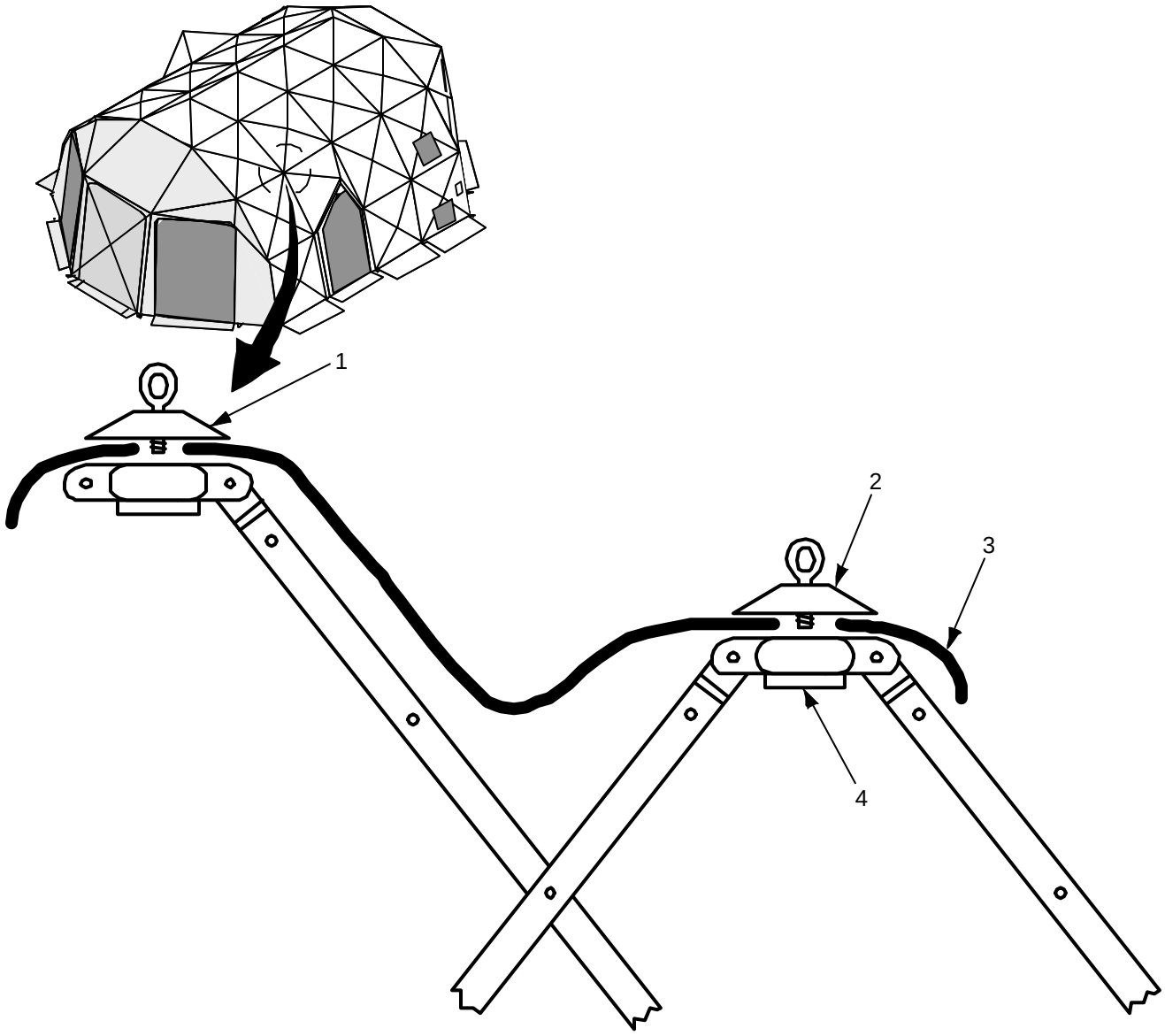

Figure 1. Shelter Keepers Removal/Replacement.

END OF TASK

SHELTER MAIN HUB REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Field repair kit

References
WP 0005

Materials/Parts
Hub

Equipment Condition
Shelter is unpacked and spread out

Personnel Required
One

NOTE

The following procedures apply to main shelter and end caps.

REMOVAL

1. If necessary, strike the shelter (Figure 2, Item 2) (see WP 0005) and separate end caps (Figure 2, Item 1) from the main section.

2. Spread shelter (Figure 2, Item 2) out to full extension.

CAUTION

When performing the following step, do not step on struts. Struts could become damaged or break due to weight.

NOTE

When performing the following step, inspect all keepers for damage (stripped threads, broken or frayed loop). Remember to keep track of which keepers went into which holes. Looped keepers must be returned to proper location(s).

3. Using spanner wrench, remove and retain keepers (Figure 2, Item 5) from damaged area.

4. Remove cover off of damaged area.

5. Identify broken main hub(s) (Figure 2, Item 4) and associated strut(s) (Figure 2, Item 3).

6. Remove and retain eight screws (Figure 2, Item 6) from damaged main hub (Figure 2, Item 7). Remove hub top (Figure 2, Item 7A).

7. Annotate location(s) of struts (Figure 2, Item 3) inside of lower main hub (Figure 2, Item 7B).

END OF TASK

REPLACEMENT

1. Remove struts (Figure 2, Item 3) from base of main hub (Figure 2, Item 7B) one at a time and place into base of new main hub (Figure 2, Item 7B).

2. Place main hub top (Figure 2, Item 7A) onto bottom half of main hub (Figure 2, Item 7B) and secure using eight screws (Figure 2, Item 6).

3. Repeat steps until all broken/damaged main hubs (Figure 2, Item 7) are replaced.

4. Re-assemble shelter (Figure 2, Item 2) and install all removed keepers (Figure 2, Item 5).

5. Verify proper assembly, erect shelter (as described in WP 0005).

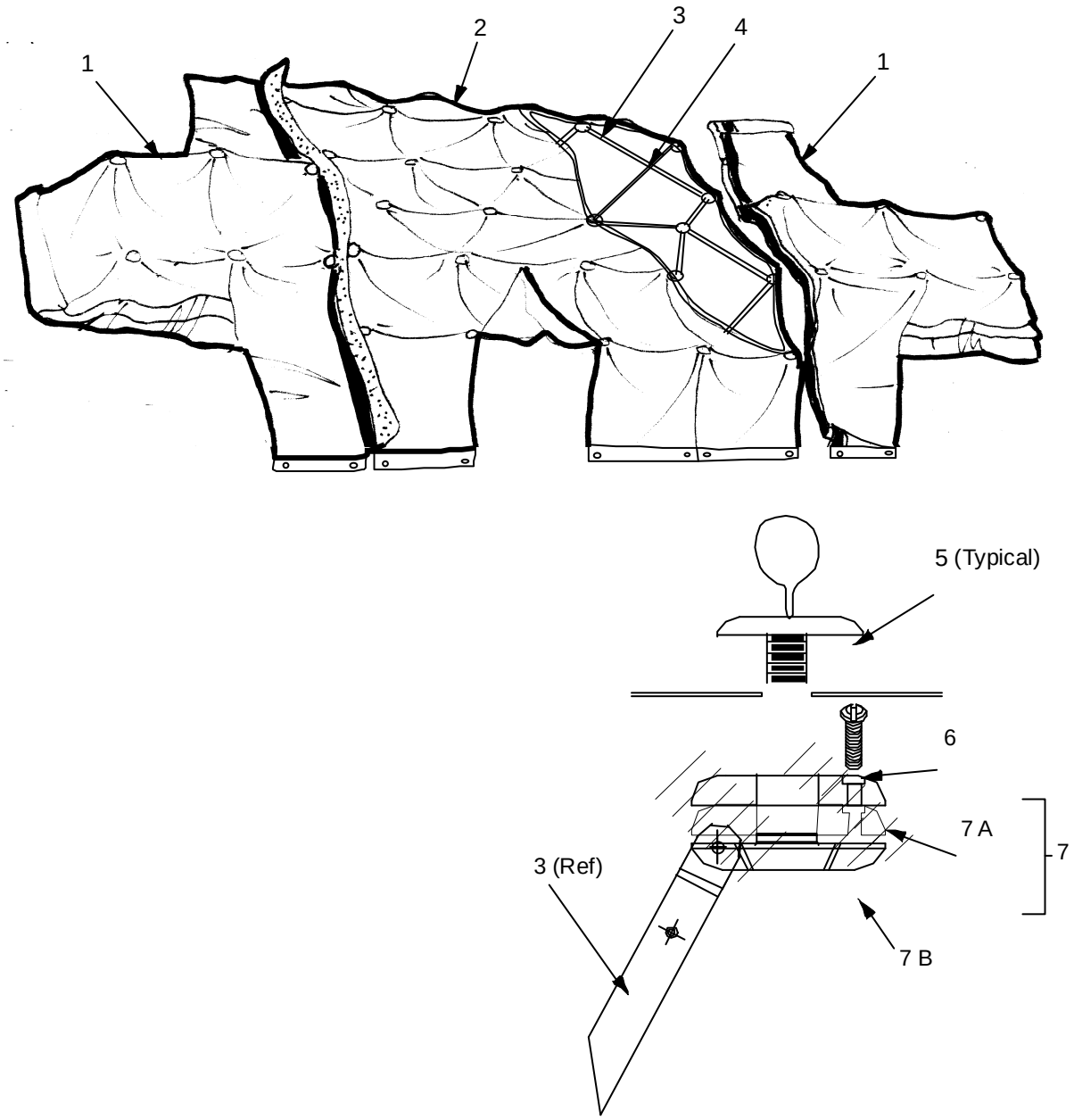

Figure 2. Shelter Main Hub(s) Removal/Replacement.

END OF TASK

MAIN STAKING BRACKET REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Field repair kit

References
WP 0005

Materials/Parts
Hub

Equipment Condition
Shelter is unpacked and spread out

Personnel Required
One

REMOVAL

1. If necessary, strike the shelter (Figure 2, Item 2) (see WP 0005) and remove shelter cover (see procedure in this WP).
2. Identify broken/damaged main staking bracket (Figure 3, Item 3).
3. Remove and retain keeper (Figure 3, Item 4) securing shelter to main staking bracket (Figure 3, Item 3).
4. Remove and retain eight screws (Figure 3, Item 1) securing main staking bracket (Figure 3, Item 3) to hub (Figure 3, Item 2).

NOTE

When performing the following step, do not allow the hub to separate.

5. Disassemble main staking bracket (Figure 3, Item 3) from hub (Figure 3, Item 2).
6. Properly dispose of damaged piece(s).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following step inspect all pieces to ensure completeness and serviceability.

1. Assemble main staking bracket (Figure 3, Item 3) and hub (Figure 3, Item 2). Secure using eight screws (Figure 3, Item 1).
2. Inspect keeper (Figure 3, Item 4) for completeness and serviceability, replace if necessary.

CAUTION

NEVER use a thread-locking additive on the keepers. This will damage the threads and prevent the keeper from being removed at a later time for repairs.

3. Install assembly to appropriate place on shelter. Secure using keeper (Figure 3, Item 4).

REPLACEMENT – Continued

4. If necessary, install cover as described in this WP.

5. Verify proper assembly, erect shelter (as described in WP 0005).

NOTE

Shelter removed for clarity.

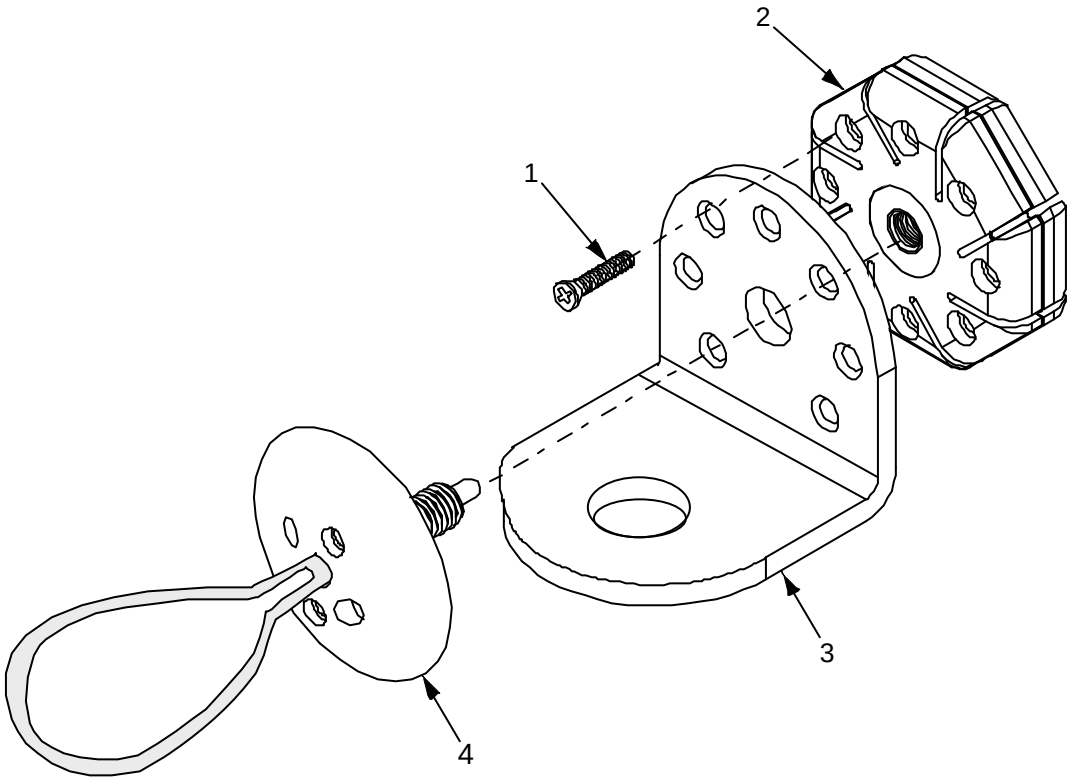

Figure 3. Main Staking Bracket Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

CHAPTER 5

MAINTAINER TROUBLESHOOTING PROCEDURES FOR TMSS-MED

MAINTAINER TROUBLESHOOTING PROCEDURES
TMSS-MED
MAINTAINER TROUBLESHOOTING INDEX

GENERAL

This WP contains a troubleshooting index of conditions/indications that may develop during maintenance or operation. Maintenance is limited to those failures that may be repaired at the Maintainer level. The troubleshooting index identifies the condition/indication, which is followed by a column that identifies the work package and page(s) where Maintainer level troubleshooting procedure(s) may be found (in the form of an inspection), followed by simple corrective actions which may be done by the Maintainer level. These inspections and corrective actions should be performed in the order listed. The index is provided to assist in the quick location of a problem. The manual cannot list all conditions/indications that may occur. If a condition/indication is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

TROUBLESHOOTING INDEX

The troubleshooting index assists the operator after a fault occurs. When a fault occurs, carefully inspect the equipment for fault indications to determine the best condition/indication to follow. The most important step in troubleshooting is recognizing the conditions/indications and combination of conditions/indications. Use the corrective action for a given condition/indication in the order of appearance. If the first repair attempt is unsuccessful, proceed to the next recommended corrective action to resolve the problem. If a fault is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

Table 1. Maintainer Troubleshooting Index.

ITEM	CONDITION/INDICATION	WP
GENSET (Electrical)		
1	Generator produces no voltage	0028-2
2	Generator produces no voltage (for one phase leg)	0028-2
3	Generator produces no voltage (all phases bad)	0028-2
4	Generator produces low voltage (under no load condition)	0028-4
5	Generator produces high voltage (under no load condition)	0028-6
6	Generator produces high voltage (under load condition)	0028-6
7	Generator produces low/high voltage (under load condition)	0028-6
8	Generator voltage fluctuates/wanders	0028-8
9	Generator frequency out of tolerance	0028-9
10	Generator builds voltage from start-up then goes to low voltage	0028-10
11	No reading present on AC meter (A-C AMPERE, HERTZ, A-C KILOWATTS A-C-VOLTS) (M1 – M4)	0028-10
12	No reading present on DC VOLTS meter (M5)	0028-11
13	HOURMETER (M7) not operating	0028-11
14	No reading present on BATTERY CHARGER AMPS meter (M9)	0028-11
15	No reading present on COOLANT TEMP gauge (M6)	0028-12
16	No reading present on OIL: PRESSURE gauge (M8)	0028-12
17	BATTLE SHORT switch (SW5) suspect bad	0028-12
18	PANEL LIGHT switch (SW2) suspect bad	0028-13
19	VOLT/AMP switch (SW1) suspect bad	0028-13
20	ENGINE switch (SW3) suspect bad	0028-14
21	ENGINE HEATER switch (SW6) suspect bad	0028-15
22	FUEL LINE HEATER switch (SW8) suspect bad	

Table 1. Maintainer Troubleshooting Index – Continued.

ITEM	CONDITION/INDICATION	WP
GENSET (Electrical) – Continued		
23	HIGH COOLANT TEMP(L3), OVERSPEED(L4) , or LOW OIL PRESSURE (L5) suspect bad	0028-16
24	Control panel light(s) (L1 – L2) suspect bad	0028-16
25	VOLTAGE ADJUST potentiometer (R1) suspect bad	0028-16
26	BATTERY SWITCH (SW9) suspect bad	0028-17
27	EMERGENCY STOP (SW7) suspect bad	0028-17
28	Circuit Breaker (CB1 – CB5) suspect bad	0028-18
29	Power distribution panel light(s) (L6 – L10) suspect bad	0028-18
30	Relay (K4, K5, or K6) suspect bad	0028-19
31	Relay (K7) suspect bad	0028-19
32	Time delay (TDM) suspect bad	0028-20
33	Watt transducer (XDR) suspect bad	0028-20
34	Current transformer (CT) suspect bad	0028-21
35	Voltage regulator (VR) suspect bad	0028-21
36	Speed sensor (SS) suspect bad	0028-22
37	Governor controller (GC) suspect bad	0028-23
38	Battery charger (BC) suspect bad	0028-24
39	Voltage regulator or generator suspect bad	0028-24
GENSET (Engine)		
1	Coolant leaking	0029-2
2	Fuel leaking	0029-3
3	Oil leaking	0029-4
4	Battery acid leaking	0029-5
5	Engine does not crank	0029-5
6	Engine turns over slowly	0029-8
7	Engine cranks but does not start	0029-9
8	Engine stops (no warning lights)	0029-16
9	Engine stops (HIGH COOLANT TEMP light on)	0029-18
10	Engine stops (LOW OIL PRESSURE light on)	0029-21
11	Engine stops (OVERSPEED light on)	0029-22
12	Engine emits white smoke from exhaust	0029-23
13	Engine emits blue smoke from exhaust	0029-23
14	Engine emits heavy black smoke from exhaust	0029-24
15	Excessive carbon deposits on exhaust outlet	0029-24
16	Engine temperature remains below 120°F (48.88°C)	0029-24
17	AC KILOWATTS meter reads 0 with Genset under load	0029-25
18	DC VOLT meter reads below 28 VDC while Genset is running	0029-25
19	Engine temperature above 220°F (104.4°C), engine still running	0029-27
20	Engine oil pressure below 20 psi, engine still running	0029-27
21	Engine heater (hydronic) will not start (no fault code)	0029-28
22	Engine heater (hydronic) (fault code F01 or F02)	0029-29
23	Engine heater (hydronic) (fault code F03)	0029-30
24	Engine heater (hydronic) (fault code F04, F05, F06, F08, F09)	0029-30
25	Engine heater (hydronic) (fault code F07)	0029-30
26	Engine heater (hydronic) (fault code F010)	0029-30

Table 1. Maintainer Troubleshooting Index – Continued.

ITEM	CONDITION/INDICATION	WP
ECU (Electrical)/Hydronic Heater		
1	ECU will not run on GENSET power	0030-2
2	ECU will not run on shore power	0030-3
3	ECU won't run in any mode	0030-3
4	ECU won't run in cool mode	0030-5
5	ECU won't run in HEAT mode. (V1)	0030-5
6	ECU won't run in HEAT HIGH (or HEAT LOW) mode (V2)	0030-6
7	Evaporator fan does not operate	0030-8
8	Condenser fan does not operate	0030-9
9	Compressor won't run	0030-10
10	Pressure switch fault	0030-12
11	Hydronic heater will not start (no fault code)	0030-13
12	Hydronic heater (fault code F01 or F02)	0030-15
13	Hydronic heater (fault code F03)	0030-15
14	Hydronic heater (fault code F07)	0030-15
15	Hydronic heater (fault code F04, F05, F06, F08, F09, F010)	0030-17
16	Coolant leaking from hydronic heater/hoses	0030-17
17	Fuel leaking from hydronic heater	0030-17
ECU (Electrical Tests)		
1	Mode select switch - Test	0030-22
2	Thermostat - Test	0030-23
3	Circuit breakers - Test	0030-24
4	Compressor contactor - Test	0030-25
5	Heater contactor - Test	0030-26
6	Transformer- Test	0030-27
7	Bridge rectifier - Test	0030-27
8	CMSP/EMSP - Test	0030-28
ECU (Heating & Cooling)/Hydronic Heater		
1	Conditioned air too warm (in Cool mode)	0031-2
2	Conditioned air too cold (in Heat mode)	0031-4
3	Blower does not operate	0031-5
4	Discharge pressure too high	0031-5
5	Discharge pressure too low	0031-5
6	Suction pressure too high	0031-5
7	Suction pressure too low	0031-5
8	Compressor fails to start	0031-5
9	Compressor "short cycles"	0031-5
10	Compressor noisy	0031-5
11	Compressor starts normally but shuts down due to overload	0031-6
12	Compressor excessively noisy	0031-6
13	Conditioned air too cold (in Heat mode)	0031-6

Table 1. Maintainer Troubleshooting Index – Continued.

ITEM	CONDITION/INDICATION	WP
TRAILER (Electrical)		
1	Tail light intermittent	0032-2
2	Tail light does not work	0032-3
TRAILER (Mechanical)		
1	Hand brake does not engage	0033-2
2	Hand brake does not disengage	0033-2
3	Brake fluid present under trailer	0033-2
4	Brake actuator does not engage	0033-2
5	Hydraulic brakes exhibit failure	0033-2
6	Trailer does not track straight when towed or leans to side	0033-3
7	Tire(s) will not hold air pressure	0033-3
8	Tongue jack assembly will not raise/lower	0033-3
9	Trailer stabilizer leg does not raise/lower	0033-3
10	Excessive motion of lunette	0033-3
SHELTER (Electrical)		
1	Shelter lighting does not come on	0034-2
2	No power from PDU	0034-2
3	Power indicator lights inoperable	0034-2

END OF WORK PACKAGE

MAINTAINER TROUBLESHOOTING PROCEDURES
TMSS-MED
GENSET (ELECTRICAL)

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)
Multimeter (WP 0165, Item 2)

References
WP 0005, WP 0013, WP 0029,
WP 0040, WP 0041, WP 0044,
WP 0068 through WP 0086

Personnel Required
Two

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the TMSS-MED by maintainer-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the TMSS-MED. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identity all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Table 1. Maintainer Troubleshooting – Genset (Electrical).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	Generator produces no voltage	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel (WP 0040) and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Wiring	Verify that Crew troubleshooting tasks (WP 0013) have been completed. Contact next level of maintenance.
2	Generator produces no voltage (for one phase leg)	VOLT/AMP switch or volt meter	Set BATTERY SWITCH to ON. Set CB5 to OFF. Set ENGINE switch to OFF. Open up generator junction box and attach DMM across the bad phase (L1, L2, or L3) to neutral (L0), on the source side. Start engine. If DMM voltage is not 120 VAC +/- 10% then replace generator (WP 0086). If within tolerance, use DMM to measure 120 VAC +/- 10% across source side (terminal 1, 5, or 7) of VOLT/AMP switch (SW1) and L0 (neutral terminal block). If within tolerance, isolate failure to either SW1 or volt meter M4. Replace faulty component. If not within tolerance, fuse or path to generator is open.
3	Generator produces no voltage (all phases bad)	Voltage regulator	Set BATTERY SWITCH to ON. Set CB5 to OFF.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
3 (cont.)	Generator produces no voltage (all phases bad)	Voltage regulator	Set ENGINE switch to OFF. Remove two voltage regulator mounting screws to access the underside. Verify the regulator fuse is not blown. Replace fuse if defective (WP 0079). Locate the F+ and F- field terminals and power input terminals (L3 at terminal 3 and L1 at terminal 4) on regulator. Verify continuity of the field terminal wires and power input wires to generator. Disconnect wires from voltage adjust terminals (6 and 7) of regulator. Verify VOLTAGE ADJUST potentiometer on Control Panel sweeps 1000 +/- 10% ohms across the wires. Replace potentiometer if bad (WP 0070). Reconnect the wires to terminals 6 and 7. Proceed to residual field loss malfunction.
	NOTE Residual magnetism in the field coils of the generator may have become too weak to initiate electrical generation. The weak magnetic flux cannot overcome wire resistance to start self generating current flow. Loss of the residual can be due to long periods of disuse, vibration during shipping, or extreme high temperature condition. The exciter field coils can be re-magnetized by applying DC voltage potential across them. This method of restoring residual magnetism is referred to as "flashing the generator".		
		Residual field loss	Flash the generator field terminals to restore residual magnetism.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
3 (cont.)	Generator produces no voltage (all phases bad)	Voltage regulator	
	CAUTION To ensure that the voltage regulator is not damaged by the flash potential (raw battery voltage), disconnect the field wires at the voltage regulator.		
			Remove generator field terminal wires #237 and #238 from F+ and F- on regulator. Connect two hookup wires to the battery positive (+) and negative (-) terminals. Connect battery (+) to wire #237 field F+ and battery (-) to wire #238 field F-. After 3 to 5 seconds, remove the battery negative (-) from the F- wire. An inductive arc should result if no arc occurs, repeat the process.
		Residual field loss	Disconnect the hookup wires from the battery and reconnect the field wires to the voltage regulator. Perform voltage regulator adjustment (WP 0079). If adjustment fails isolate to voltage regulator or generator. Proceed to Step 39.
4	Generator produces low voltage (under no load condition)	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
4 (cont.)	Generator produces low voltage (under no load condition)	Output out of adjustment	Verify that Crew troubleshooting tasks (WP 0013) have been completed. Contact next level of maintenance.
		Under-speed operation	Verify HERTZ meter shows a reading of 60 HZ +/- 10%. If out of tolerance perform governor control adjustment (WP 0081).
		Voltmeter	Set BATTERY SWITCH to ON. Start engine. Set VOLT/AMP switch to L1. Use a DMM to measure 120 VAC +/- 10% across the L1 (black) and L0 (neutral) terminal blocks. If the voltage is not within tolerance proceed to the voltage regulator malfunction. If the voltage is within tolerance replace the voltmeter (WP 0068) or VOLT/AMP switch (SW1) (WP 0070).
		Voltage regulator	Set BATTERY SWITCH to ON. Set CB5 to OFF. Set ENGINE switch to OFF. Remove two voltage regulator mounting screws to access the underside. Verify the regulator fuse is not blown. Replace fuse if defective (WP 0079). Disconnect wires from voltage adjust terminals (6 and 7) of regulator and verify VOLTAGE ADJUST potentiometer on Control Panel sweeps 1000 +/- 10% ohms across the wires. Replace potentiometer (WP 0070) if bad.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
4 (cont.)	Generator produces low voltage (under no load condition)	Voltage regulator	Reconnect the wires to terminals 6 and 7. Perform voltage regulator adjustment (WP 0079). If adjustment fails isolate to voltage regulator or generator. Proceed to Step 39.
5	Generator produces high voltage (under no load condition)	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Output out of adjustment	Verify that Crew troubleshooting tasks (WP 0013) have been completed. Contact next level of maintenance.
6	Generator produces high voltage (under load condition)	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. pen Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Output out of adjustment	Verify that Crew troubleshooting tasks (WP 0013) have been completed. Contact next level of maintenance.
7	Generator produces low/high voltage (under load condition)	Excessive load	Verify A-C Killowatts meter reads below the maximum of 18 kW output power. If greater than 18 kW reduce the load.
		Unbalanced load	Use the VOLT/AMP switch to monitor the voltage and current on each phase of the generator.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
7 (cont.)	Generator produces low/high voltage (under load condition)	Unbalanced load	If current draw on one phase varies greatly from the others, swap loads to different connectors to balance load.
		Voltage meter	Set BATTERY SWITCH to ON. Start engine. Set VOLT/AMP switch to L1. Use a DMM to measure 120 VAC +/- 10% across the L1 (black) and L0 (neutral) terminal blocks. If the voltage is not within tolerance proceed to the voltage regulator malfunction. If the voltage is within tolerance replace the voltmeter (WP0068).
		Voltage regulator	Set BATTERY SWITCH to ON. Set CB5 to OFF. Set ENGINE switch to OFF. Remove two voltage regulator mounting screws to access the underside. Verify the regulator fuse is not blown. Replace fuse if defective (WP 0079). Disconnect wires from voltage adjust terminals (6 and 7) of regulator and verify VOLTAGE ADJUST potentiometer on Control Panel sweeps 1000 +/- 10% ohms across the wires. Replace potentiometer if bad (WP 0070). Reconnect the wires to terminals 6 and 7. Perform voltage regulator adjustment (WP 0079). If adjustment fails isolate to voltage regulator or generator. Proceed to Step 39.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
8	Generator voltage fluctuates/wanders	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Diesel Engine not operating properly	Verify that Crew troubleshooting tasks (WP 0013) have been completed. Contact next level of maintenance.
		Voltage regulator	Set BATTERY SWITCH to ON. Set CB5 to OFF. Set ENGINE switch to OFF. Remove two voltage regulator mounting screws to access the underside. Verify the regulator fuse is not blown. Replace fuse if defective (WP 0079). Disconnect wires from voltage adjust terminals (6 and 7) of regulator and verify VOLTAGE ADJUST potentiometer on Control Panel sweeps 1000 +/- 10% ohms across the wires. Replace potentiometer if sweep isn't smooth or has dead spots (WP 0070). If wires shielded, verify ground continuity of shield. Reconnect the wires to terminals 6 and 7. Perform voltage regulator adjustment (WP 0079). If adjustment fails replace voltage regulator (WP 0079).

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
8 (cont.)	Generator voltage fluctuates/wanders	Frequency wandering	Start engine. Set CB5 and CB1 to ON. Operate ECU in heat or cool mode. Verify HERTZ meter frequency is stable. If frequency fluctuates/wanders perform governor adjustment (WP 0081), troubleshoot governor (WP 0029) if adjustment doesn't correct problem.
9	Generator frequency out of tolerance	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Generator load unbalanced across all three phases	Verify that Crew troubleshooting tasks (WP 0013) have been completed. Using VOLT/AMP selector switch, check amperage draw across each phase. If draw is not balanced throughout each phase, transfer draw from one phase to another. Primarily done by changing the plug used on the PDU, Leg 1 is CB1 and CB4, Leg 2 is CB2 and CB5, Leg 3 is CB3 and CB6.
		Contaminated fuel/fuel filter	Remove fuel filter (WP 0044). Inspect fuel and filter. If contamination is suspected, replace fuel filter, drain, and refill fuel tank (WP 0044). Restart engine (WP 0005). If condition persists, contact next level of maintenance.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
9 (cont.)	Generator frequency out of tolerance	Governor failure	Perform governor adjustment (WP 0081). Troubleshoot governor (WP 0029) if adjustment doesn't bring frequency within tolerance.
10	Generator builds voltage from start-up then goes to low voltage	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040). Verify that Crew troubleshooting tasks (WP 0013) have been completed. Contact next level of maintenance.
		Voltage regulator	Perform regulator adjustment (WP 0079). Replace regulator (WP 0079) if adjustment doesn't correct problem.
11	No reading present on AC meter (A-C AMPERE, HERTZ, A-C KILOWATTS A-C-VOLTS) (M1 – M4)	Bad/incorrect connection	Disconnect terminals from meter. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.
		Bad meter	Test meter as described in (WP 0069). If appropriate reading present on DMM, replace DC VOLTS meter (WP 0069). If appropriate reading not present on DMM. Continue troubleshooting circuit.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
12	No reading present on DC VOLTS meter (M5)	Bad/incorrect connection	Disconnect terminals from meter. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.
		Bad meter	Test DC VOLTS meter as described in (WP 0069). If appropriate input on DMM, replace DC VOLTS meter (WP 0069). If input not present, continue troubleshooting circuit.
13	HOURMETER (M7) not operating	Bad/incorrect connection	Disconnect terminals from meter. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.
		Bad meter	Test HOURMETER as described in (WP 0069). If appropriate input on DMM, replace HOURMETER (WP 0069). If input not present, continue troubleshooting circuit.
14	No reading present on BATTERY CHARGER AMPS meter (M9)	Bad/incorrect connection	Disconnect terminals from meter. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.
		Bad meter	Test BATTERY CHARGER AMPS meter as described in WP 0106. If appropriate reading on DMM, replace BATTERY CHARGER AMPS meter (WP 0069). If input not present, continue troubleshooting circuit.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
15	No reading present on COOLANT TEMP gauge (M6)	Bad/incorrect connection	Disconnect terminals from gauge. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.
		Bad gauge	Test COOLANT TEMP gauge as described in (WP 0069). If appropriate reading on DMM, replace COOLANT TEMP gauge (WP 0069). If input not present, continue troubleshooting circuit.
16	No reading present on OIL: PRESSURE gauge (M8)	Bad/incorrect connection	Disconnect terminals from gauge. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.
		Bad gauge	Test OIL PRESSURE gauge as described in (WP 0069). If appropriate reading present on DMM, replace OIL PRESSURE gauge (WP 0069). If appropriate reading not present on DMM. Continue troubleshooting circuit.
17	BATTLE SHORT switch (SW5) suspect bad	Bad/incorrect connection	Disconnect terminals from switch. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

<table>
<tr><th>ITEM</th><th>CONDITION/INDICATION</th><th>POSSIBLE MALFUNCTION</th><th>CORRECTIVE ACTION</th></tr>
<tr><td>17 (cont.)</td><td>BATTLE SHORT switch (SW5) suspect bad</td><td>Bad switch</td><td>Disconnect terminals from switch. Set DMM to read ohms. Connect meter leads to terminals on BATTLE SHORT switch and toggle switch. DMM should read open with switch off and short with switch on. IF these conditions are not met, BATTLE SHORT switch bad, replace (WP 0070).</td></tr>
<tr><td>18</td><td>PANEL LIGHT switch (SW2) suspect bad</td><td>Bad/incorrect connection</td><td>Disconnect terminals from switch.

Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.

Ensure connectors CF2 and CM2 are properly connected and no wires are loose.</td></tr>
<tr><td></td><td></td><td>Jumper missing off of ENGINE switch</td><td>Check ENGINE switch for jumpers:
<table><tr><th>FROM (terminal #)</th><th>TO (terminal #)</th></tr><tr><td>3</td><td>7</td></tr><tr><td>7</td><td>11</td></tr></table></td></tr>
<tr><td></td><td></td><td>Bad PANEL LIGHT switch</td><td>Disconnect terminals from PANEL LIGHT switch. Set DMM to read ohms. Connect meter leads to read from terminals #1 to #2 on PANEL LIGHT switch and toggle switch. DMM should read open with switch off and short with switch on. IF these conditions are not met, PANEL LIGHT switch bad, replace (WP 0070).</td></tr>
<tr><td>19</td><td>VOLT/AMP switch (SW1) suspect bad</td><td>Bad/incorrect connection</td><td>Disconnect terminals from switch.

Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.

Ensure connectors CF2 and CM2 are properly connected and no wires are loose.</td></tr>
</table>

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

<table>
<tr><th>ITEM</th><th>CONDITION/INDICATION</th><th>POSSIBLE MALFUNCTION</th><th>CORRECTIVE ACTION</th></tr>
<tr><td>19
(cont.)</td><td>VOLT/AMP switch (SW1) suspect bad</td><td>Bad/incorrect connection</td><td>Check switch for jumpers:
<table><tr><th>FROM
(terminal #)</th><th>TO
(terminal #)</th></tr><tr><td>2</td><td>6</td></tr><tr><td>4</td><td>8</td></tr><tr><td>10</td><td>14</td></tr><tr><td>12</td><td>16</td></tr><tr><td>11</td><td>19</td></tr><tr><td>13</td><td>17</td></tr></table></td></tr>
<tr><td></td><td></td><td>Bad switch</td><td>Check for 120 VAC input at across the source side (terminal 1, 5, or 7) of VOLT/AMP switch (SW1) and L0 (neutral) terminal blocks.

If 120 VAC (±10%) present at all three inputs of VOLT/AMP switch (SW1) switch is bad. Replace (WP 0070).

If 120 VAC (±10%) not present for any phase. Continue troubleshooting circuit.</td></tr>
<tr><td>20</td><td>ENGINE switch (SW3) suspect bad</td><td>Jumper missing off of ENGINE switch</td><td>Check switch for jumpers:
<table><tr><th>FROM
(terminal #)</th><th>TO
(terminal #)</th></tr><tr><td>3</td><td>7</td></tr><tr><td>7</td><td>11</td></tr></table></td></tr>
<tr><td></td><td></td><td>Bad/incorrect connection</td><td>Disconnect terminals from switch.

Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.

Ensure connectors CF2 and CM2 are properly connected and no wires are loose.</td></tr>
<tr><td></td><td></td><td>Bad switch</td><td>Replace (WP 0070).</td></tr>
</table>

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
21	ENGINE HEATER switch (SW6) suspect bad	Bad/incorrect connection	Disconnect terminals from switch. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.
		Fuses at Engine heater blown	Check and replace fuses at engine heater.
		Bad switch	Disconnect terminals from switch. Set DMM to read ohms. Connect meter leads to read from terminals #1 to #4 and #2 to #3 on ENGINE HEATER switch (SW6). Toggle switch. DMM should read open with switch off and short with switch on. IF these conditions are not met, ENGINE HEATER switch (SW6) bad, replace (WP 0070).
22	FUEL LINE HEATER switch (SW8) suspect bad	Jumper missing off of FUEL LINE HEATER switch	Check switch for jumpers: **FROM (terminal #)** / **TO (terminal #)** 3 / 4
		Bad/incorrect connection	Disconnect terminals from switch. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.
		Bad switch	Disconnect terminals from switch. Set DMM to read ohms. Connect meter leads to read from terminals #1 to #4 and #2 to #3 on FUEL LINE HEATER switch (SW8). Toggle switch. DMM should read open with switch off and short with switch on. IF these conditions are not met, FUEL LINE HEATER switch (SW8) bad, replace (WP 0070).

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
23	HIGH COOLANT TEMP(L3), OVERSPEED(L4) , or LOW OIL PRESSURE (L5) suspect bad	Bad/incorrect connection	Disconnect terminals from light. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose. Also check connections at meters (M6 and M8). If all lights are not working check common connection at ENGINE switch (SW3).
		Bad socket	Disconnect terminals from bad light and from one "good "light. Re-connect terminals from bad light to "good" light. If light operates, socket bad replace (WP 0071).
24	Control panel light(s) (L1 – L2) suspect bad	Bad/incorrect connection	Disconnect terminals from light. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. If both lights are not working check common connection at PANEL LIGHTS switch (SW2).
		Bad socket	Swap terminals from bad light and from "good "light. If light operates, socket bad replace (WP 0071). If one or both lights still do not work, troubleshoot PANEL LIGHTS switch (SW2).
25	VOLTAGE ADJUST potentiometer (R1) suspect bad	Jumper missing off of potentiometer	Inspect potentiometer for jumper between wiper (center terminal) and max (right terminal). If jumper is damaged, missing or not making good connection repair/replace (WP 0070).

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
25 (cont.)	VOLTAGE ADJUST potentiometer (R1) suspect bad	Bad/incorrect connection	Inspect terminals of potentiometer for good solder connections. If solder joints are damaged, missing or not making good connection repair/replace (WP 0070). Disconnect terminals from wiring harness. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.
		Potentiometer bad	Disconnect terminals from potentiometer. Set DMM to read ohms. Connect meter leads to maximum and minimum terminals on potentiometer. Fully rotate shaft on potentiometer. Meter should sweep smoothly from 0Ω to 1,000Ω. If DMM shows any irregularities (i.e., suddenly drops to 0 Ω or is erratic in operation) replace potentiometer (WP 0070).
26	BATTERY SWITCH (SW9) suspect bad	Bad/incorrect connection	Disconnect fuse from battery (WP 0041). Remove panel (WP 0072). Disconnect terminals from switch. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.
		Bad switch	Disconnect terminals from switch. Set DMM to read ohms. Connect meter leads to terminals on BATTERY SWITCH (SW9). Toggle switch. DMM should read open with switch off and short with switch on. IF these conditions are not met, BATTERY SWITCH (SW9) bad, replace (WP 0072).
27	EMERGENCY STOP (SW7) suspect bad	Bad/incorrect connection	Disconnect fuse from battery (WP 0041). Remove panel (WP 0072).

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
27 (cont.)	EMERGENCY STOP (SW7) suspect bad	Bad switch	Disconnect terminals from switch. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Disconnect terminals from switch. Set DMM to read ohms. Connect meter leads to terminals on EMERGENCY STOP (SW7). Pull switch in and out. DMM should read open with switch in and short with switch out. If these conditions are not met, EMERGENCY STOP (SW7) bad, replace (WP 0072).
28	Circuit Breaker (CB1 – CB5) suspect bad	Bad/incorrect connection	Disconnect fuse from battery (WP 0041). Remove panel (WP 0072). Disconnect terminals from suspect CB. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.
		Bad circuit breaker (CB1 – CB5)	Disconnect all terminals from suspect CB. Set DMM to read ohms. Connect meter leads to terminals of suspect CB. Toggle CB. DMM should read open with CB off and short with CB on. If these conditions are not met, CB bad, replace (WP 0082).
29	Power distribution panel light(s) (L6 – L10) suspect bad	Bad/incorrect connection	Ensure connectors CF3/CM3 and CF4/CM4 are properly connected and no wires are loose. Disconnect terminals from light. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. If multiple lights are not working check common connections. (wire #s 117 and 149).

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
29 (cont.)	Power distribution panel light(s) (L6 – L10) suspect bad	Bad socket	Swap terminals from bad light and from "good "light. If light operates, socket bad replace (WP 0074). If one or more lights still do not work, troubleshoot wiring to pin #2 of light(s).
30	Relay (K4, K5, or K6) suspect bad	Bad/incorrect connection	Remove relay from socket. Inspect relay and socket for good connection or corrosion. Clean terminals. Inspect individual wires going into socket for good connection, visible damage and/or corrosion. Re-seat wires as necessary. Ensure connectors CF2/CM2 are properly connected and no wires are loose.
		Bad relay	Relays K4, K5 and K6 are interchangeable. Swap known good relay for suspect relay. If problem moves with relay. Bad relay, replace (WP 0077). If problem does not move with relay, bad socket on barrier panel. Contact next level of maintenance.
31	Relay (K7) suspect bad	Bad/incorrect connection	Remove K7 relay from socket. Inspect relay and socket for good connection or corrosion. Clean terminals. Inspect individual wires going into socket for good connection, visible damage and/or corrosion. Re-seat wires as necessary. Ensure connectors CF2/CM2 are properly connected and no wires are loose.
		Bad relay	If problem does not get resolved, K7 relay is bad replace (WP 0077).

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

<table>
<tr><th>ITEM</th><th>CONDITION/INDICATION</th><th>POSSIBLE MALFUNCTION</th><th>CORRECTIVE ACTION</th></tr>
<tr><td>32</td><td>Time delay (TDM) suspect bad</td><td>Fuse F2 bad</td><td>Check F2 ensure LED is not illuminated. If Illuminated, replace fuse (WP 0040).</td></tr>
<tr><td></td><td></td><td>Bad/incorrect connection</td><td>Disconnect terminals from time delay.

Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.

Ensure connectors CF2/CM2 are properly connected and no wires are loose.</td></tr>
<tr><td></td><td></td><td>K7 relay bad</td><td>Check K7 relay as described in this WP.

Time delay bad, replace (WP 0078).</td></tr>
<tr><td>33</td><td>Watt transducer (XDR) suspect bad</td><td>Fuse bad</td><td>Check fuses F1 and F3 ensure LED is not illuminated. If Illuminated, replace fuse (WP 0040).</td></tr>
<tr><td></td><td></td><td>Bad/incorrect connection</td><td>Disconnect terminals from time delay.

Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.

Ensure connectors CF2/CM2 are properly connected and no wires are loose.</td></tr>
<tr><td></td><td></td><td>Bad Input</td><td>Measure AC input to Watt Transducer:

<table><tr><th>AC INPUT</th><th>FROM</th><th>TO</th><th>DMM Reading</th></tr><tr><td>L1</td><td>2</td><td>11</td><td>120 VAC</td></tr><tr><td>L3</td><td>8</td><td>11</td><td>120 VAC</td></tr></table></td></tr>
</table>

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
33 (cont.)	Watt transducer (XDR) suspect bad	Bad current transformer	Shut down Genset (WP 0005). Disconnect fuse from battery (WP 0041). Remove panel (WP 0072). Set DMM to read ohms. Measure resistance across CTs. If DMM reads open, CT bad, replace (WP 0075). Bad watt transducer, replace.
34	Current transformer (CT) suspect bad	Bad/incorrect connection	Disconnect terminals from suspect current transformer. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2/CM2 are properly connected and no wires are loose.
		Bad current transformer	Set DMM to read ohms. Measure resistance across CTs. If DMM reads open, CT bad, replace (WP 0075).
		Bad watt transducer	Troubleshoot watt transducer as described in this WP.
35	Voltage regulator (VR) suspect bad	Fuse bad	Check F1 and F7 ensure LED is not illuminated. If Illuminated, replace fuse (WP 0040).
		Bad/incorrect connection	Disconnect terminals from Voltage regulator. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2/CM2 are properly connected and no wires are loose.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
35 (cont.)	Voltage regulator (VR) suspect bad	Voltage regulator out of adjustment	Refer to (WP 0079) for the following adjustment procedures: • Voltage Output • Stability • V/Hz Roll-Off Freq
		Poor voltage regulation	Replace voltage regulator (WP 0079).
36	Speed sensor (SS) suspect bad	Bad/incorrect connection	Disconnect terminals from speed sensor. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connections to TB1 are properly connected and no wires are loose. Ensure connectors CM1, CM2, CM3, and CM4 are properly connected and no wires are loose.
		Speed sensor bad	Set DMM to read ohms. Measure resistance across pins. 8 and 9 of speed sensor. DMM should read 0 Ω. Measure resistance across pins. 12 and 13 of speed sensor. DMM should read 0 Ω. If any resistance present, replace speed sensor (WP 0080).
		No power to speed sensor	Energize system (WP 0005). Set DMM to read VDC. Measure across pins 1 and 2 of speed sensor for 28 VDC. If 28 VDC not present troubleshoot power source. Set DMM to read VAC. Measure across pins 3 and 4 of speed sensor. If DMM does not read >1.0 VAC rms, replace speed sensor (WP 0080).

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

<table>
<tr><th>ITEM</th><th>CONDITION/INDICATION</th><th>POSSIBLE MALFUNCTION</th><th>CORRECTIVE ACTION</th></tr>
<tr><td>37</td><td>Governor controller (GC) suspect bad</td><td></td><td>NOTE

Refer to (WP 0081) for brief description of potentiometers and their functionality.</td></tr>
<tr><td></td><td></td><td>Bad/incorrect connection</td><td>Disconnect terminals from governor controller.

Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.

Ensure connections to TB1 are properly connected and no wires are loose.

Ensure connectors CM1, CM2, CM3, and CM4 are properly connected and no wires are loose.</td></tr>
<tr><td></td><td></td><td>No power to governor controller.</td><td>Energize system (WP 0005).

Set DMM to read VDC.

Measure across pins 1 and 2 of governor controller for 12-15 VDC. If voltage not present troubleshoot power source.</td></tr>
<tr><td></td><td></td><td>No speed signal to governor</td><td>With the engine running, check for the following:

<table><tr><th>FROM (pin #)</th><th>TO (pin #)</th><th>DMM Reading</th></tr><tr><td>2</td><td>3</td><td>5-30 VDC</td></tr><tr><td>2</td><td>4</td><td>5-30 VDC</td></tr></table>
If governor does not meet requirements, replace as described in (WP 0081).</td></tr>
<tr><td></td><td></td><td>Governor not tuned or adjusted for engine/ application</td><td>Perform adjustments for:
• Gain (P2)
• Integral Adjust (P3)
• Speed (Freq.) (P4)
• Derivative (P6)
as described in (WP 0118).</td></tr>
<tr><td></td><td></td><td>Governor will not adjust.</td><td>If governor will not adjust, replace as described in (WP 0081).</td></tr>
</table>

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
38	Battery charger (BC) suspect bad	Bad/incorrect connection	Disconnect terminals from speed sensor. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.
		No 120 VAC to battery charger	Energize system (WP 0005). Set DMM to read VAC. Measure across pins L and N of battery charger for 120 VAC. If 120 VAC not present, check in-line fuse to battery charger. If fuse bad replace, if fuse is good, troubleshoot power source.
		No DC voltage from battery charger	Set DMM to read VDC. Measure across pins + and - of battery charger for 24 VDC. If 24 VDC battery charger bad, replace (WP 0083).
39	Voltage regulator or generator suspect bad	Generator physical damage.	Remove generator covers and perform visual inspection: burnt windings, loose connections, broken wires, frayed insulation, cracked brackets, missing hardware, etc. Check for foreign objects which may have been drawn into the generator. Verify that the generator's air gaps (main rotor and exciter) are free from obstructions.
		Generator insulation breakdown.	Inspect generator for heavy buildup of contamination (dirt, oil, moisture etc.) on the windings. Clean and dry windings.
		Voltage regulator faulty.	Perform the following test to isolate failure to voltage regulator or generator.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
39 (cont.)	Voltage regulator or generator suspect bad.		

CAUTION

To ensure that the voltage regulator is not damaged by applied battery voltage, in step 2 below, disconnect the field wires at the generator junction box and isolate them from contact with any moving or electrical conducting surface.

1. Shutdown the Genset (WP 0005).
2. Remove generator junction box cover. Disconnect red F (+) and black F (-) generator field wires at the spade lug connectors. Isolate voltage regulator side of field terminal wires to ensure contact cannot occur with any electrical conducting or rotating surfaces.
3. Connect the multimeter terminals across two generator phase legs (L1 to L2, L1 to L3, or L2 to L3) for line-to-line voltage measurement in step 6 below.

NOTE

In step 4, use only one 12 Volt battery from the 24 Volt series connected battery. Refer to figure 1 for hookup. The voltage regulator feedback circuit will be replaced by a constant battery voltage applied to the generator field terminals.

4. Use hookup wire to run jumper connections from the genset battery positive (+) to the red F (+) field wire and negative (-) to the black F (-) generator field wire at the junction box.
5. Start up the genset (WP 0005). Leave CB5 in the OFF position to ensure no load is applied to the generator.
6. Use the multimeter to verify the three line-to-line voltage outputs are within (175 to 240 VAC).
7. If the voltage outputs are correct, replace the voltage regulator. If any voltage measurement fails, replace the generator.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION

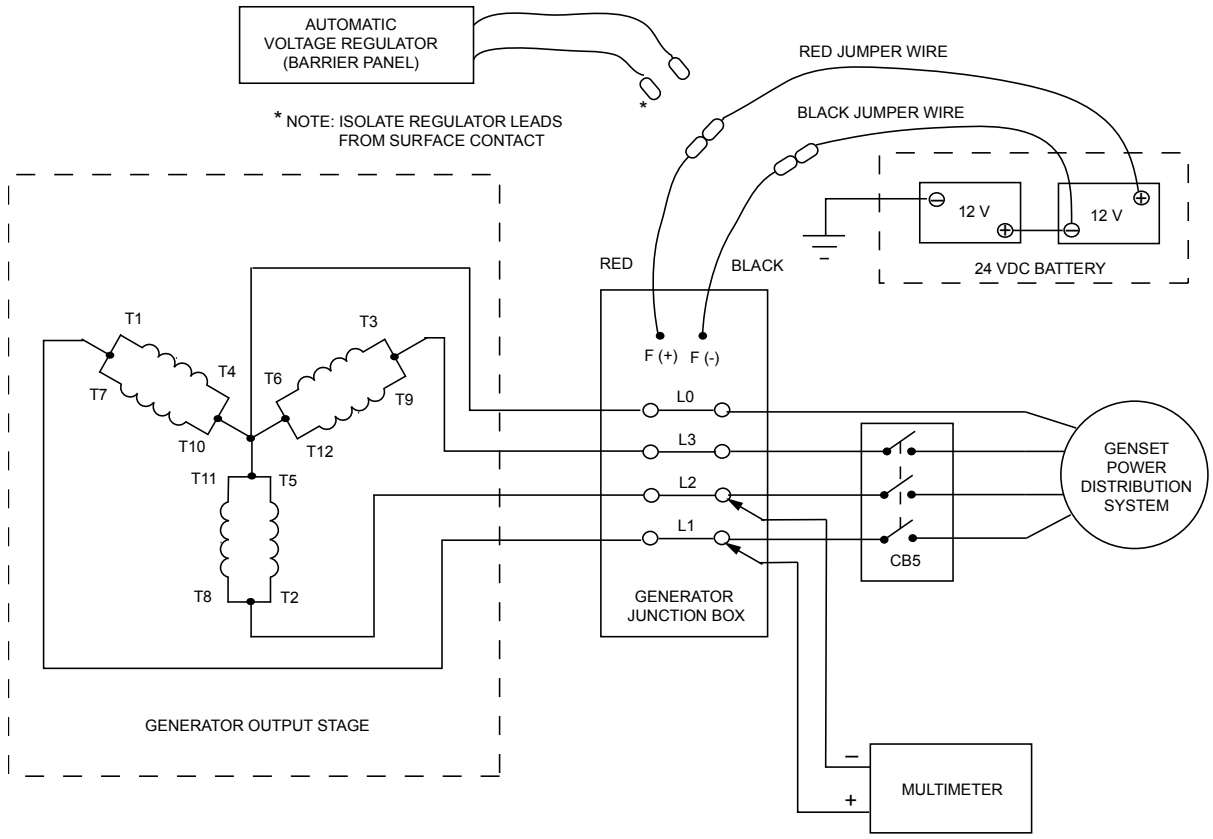

Figure 1. 12V Constant Voltage Test Hookup.

END OF WORK PACKAGE

MAINTAINER TROUBLESHOOTING PROCEDURES
TMSS-MED
GENSET (ENGINE)

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0162, Item 1)
Multimeter (WP 0162, Item 2)

Personnel Required
Two

References
WP 0040 through WP 0065,
WP 0068 through WP 0070,
WP 0072, WP 0080, WP 0081,
WP 0083 through WP 0086

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the TMSS-MED by maintainer-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the TMSS-MED. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identity all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Table 1. Maintainer Troubleshooting – Genset (Engine).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	Coolant leaking	Over flow bottle leaking	Inspect bottle/coolant hoses for damage/leaks. Replace hoses, bottle (WP 0059) and replenish coolant (WP 0058) as necessary.
		Coolant hoses leaking	Inspect radiator and coolant hoses for damage or loose clamps. Replace if necessary (WP 0059). Inspect coolant lines/hoses of battery warmer and engine heater (hydronic) for damage or loose clamps. If clamps are loose, tighten. If damage is present or leaks persist, contact next level of maintenance. If replacing coolant hose does not correct the leak replace the higher level assembly.
		Battery warming tray	Inspect battery warming tray and fittings for leaks. Tighten fittings or replace battery warming tray (WP 0041).
		Engine coolant temperature sensing leaking	Inspect sensor for leaking. If leaking around sensor, remove sensor, apply sealant to threads and install sensor (WP 0055).
		Engine thermostatic switch leaking	Inspect switch for leaking. If leaking around switch, remove switch, apply sealant to threads and install switch (WP 0056).
		Radiator leaking	Inspect radiator for damage/ leaks. If damage or leaks are found, replace radiator (WP 0059).
		Thermostat housing leaking	Inspect thermostat housing and seal for leaks. If leaks are found, remove housing, replace thermostat seal and install housing (WP 0057).

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1 (cont.)	Coolant leaking	Water pump leaking	Inspect water pump and seal for leaks. If water pump is leaking, remove water pump, install new seal, remount water pump, and test. If water pump is leaking from front bearing housing or drain port, replace water pump and seal (WP 0063).
		Coolant drain valve will not lock/leaking	Inspect coolant drain for leaking/functionality. If drain valve is not functioning or is leaking, contact next level maintenance. Replace radiator (WP 0059).
		Engine heater (hydronic) has internal leak	Inspect engine heater (hydronic). If any leaks are found from the pump or the body of the heater, replace engine heater (hydronic) (WP 0064).
		Engine head gasket leaking	Contact next level of maintenance.
2	Fuel leaking	Fuel filter leaking	Inspect filter for signs of leaking. If leaks are found, replace filter (WP 0044).
		Fuel lines leaking	Inspect fuel lines for leaking, damage, or loose clamps. If clamps are loose, tighten. If damage is present or leaks persist, replace fuel lines (WP 0084).
		Fuel tank leaking	Drain all fuel (WP 0045). Operate generator on alternate fuel source. Replace fuel tank (WP 0085).
		Fuel tank drain valve will not lock/leaking	Inspect fuel drain valve for damage or signs of leaking. If any leaking is found, drain all fuel, operate generator on alternate fuel source. Replace fuel tank (WP 0085).

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
2 (cont.)	Fuel leaking	Fuel selector switch leaking	Inspect fuel selector switch for leaking, damaged, or loose clamps. If clamps are loose, tighten. If damage is found or leaks persist, replace fuel selector switch (WP 0084).
		Fuel injectors/injector pumps leaking	Inspect for loose or damaged fittings or leaks. Replace leaking fuel injector/ injector pump (WP 0048).
		Fuel pump leaking	Inspect fuel pump for leaks. Replace fuel pump (WP 0047).
3	Oil leaking	Oil filter leaking	Inspect filter for signs of leaking. If leaks are found, replace filter (WP 0042).
		Oil pressure sending unit leaking	Inspect sending unit for leaking around mounting hardware. If leaks are present, remove sending unit and hardware, coat threads with sealant and install (WP 0051).
		Oil pressure switch leaking	Inspect switch for leaking around mounting hardware. If leaks are present, remove switch and hardware, coat thread with sealant and install (WP 0050).
		Oil drain valve will not lock/leaking	Inspect oil drain valve for leaking or damage. If any leaks or damage found, replace drain valve (WP 0042).
		Oil drain lines leaking	Inspect oil drain lines for leaking, damage, or loose clamps. If clamps loose, tighten. If damage is found or leaks persist, replace damaged oil drain line (WP 0042).

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
3 (cont.)	Oil leaking	Valve cover/oil pan leaking	Inspect valve cover and oil pan for loose bolts. Inspect seals. If seals are damaged, replace engine (WP 0086).
		Main engine seals leaking	Inspect front and rear of engine for signs of leaking. Oil leaking from generator indicates a bad rear main seal. If leaks are found, replace engine (WP 0086).
4	Battery acid leaking	Battery	Replace battery (WP 0041).
5	Engine does not crank	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel (WP 0040) and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Fuse repeatedly blows	Set ENGINE switch to OFF. Set BATTERY SWITCH to OFF. Use continuity measurements on faulty fuse line to isolated component failure. If short to ground, remove components one at a time until ground short is located. If not short to ground, replace faulty fuse and repeat continuity measurement for adjacent power line shorts. If fault not isolated, perform continuity measurements on ENGINE switch and BATTERY SWITCH.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
5 (cont.)	Engines does not crank	Low/bad battery	Set BATTERY SWITCH to OFF. Using DMM, measure across battery terminals. If DMM reads: 0 VDC – Replace battery fuse (WP 0041). < 18 VDC - Replace batteries (WP 0041). 18 to 24 VDC – Recharge batteries (WP 0023). > 28 VDC - Replace batteries (WP 0041). If battery was not replaced, replace battery (WP 0041). Set BATTERY SWITCH to ON. Remove NATO/Slave cable from J6 if connected. Remove external charging cable from J5 if connected. Set CB2 and CB5 to OFF. Crank engine. If engine does not start continue to next possible malfunction. If engine runs, set CB2 and CB5 to ON, verify battery charge meter reads 0 or more amps. If less than 0 amps, proceed to step 16.
		Connections	Check electrical connections for damaged wires, loose connections, or corrosion. If necessary, tighten, clean, or re-connect.
		Starter system (Starter solenoid (K2) located on front of engine, top solenoid)	Using DMM, measure voltage at terminal (1) on K2 solenoid for 24 to 28 VDC (see Figure 1). If 24 to 28 VDC not present, check connections from starter to K2 solenoid.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
5 (cont.)	Engines does not crank	Starter system (Starter solenoid (K2) located on front of engine, top solenoid)	Using DMM, check for continuity between terminal (2) on K2 solenoid and engine ground (see Figure 1). If no or restricted continuity, check wiring between solenoid and ground for connections. Hold ENGINE switch to START. Using a DMM, measure voltage at terminal (3) on K2 solenoid (see Figure 1). If voltage is not between 24 to 28 VDC, contact next level of maintenance. Using a DMM, measure voltage at terminal (4) on K2 solenoid (see Figure 1). If voltage is not between 24 to 28 VDC, replace solenoid (WP 0052). If voltage is between 24 to 28VDC, replace starter (WP 0053).

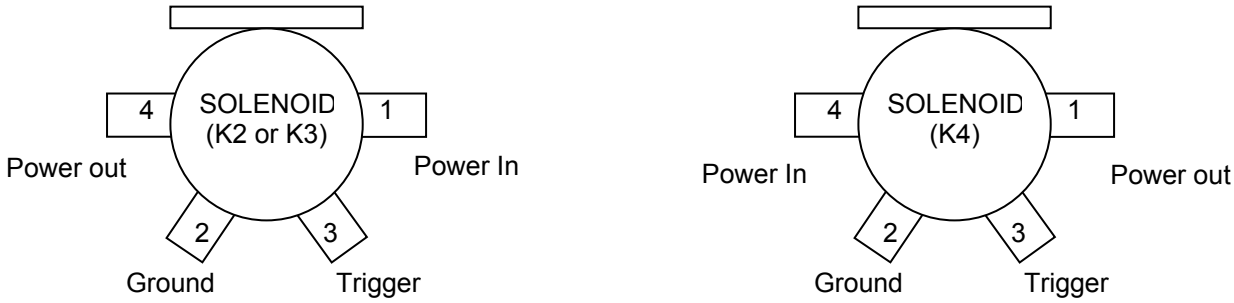

Figure 1. Solenoids.

			Verify Engine Selector Switch (ESS). Set ENGINE switch to STOP. Using a DMM, measure battery voltage (24 to 28 VDC), across ESS terminal 1 and engine block ground lug (EBGL).

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
5 (cont.)	Engines does not crank	Starter system (Starter solenoid (K2) located on front of engine, top solenoid)	If voltage out of tolerance is trace voltage back to battery. If voltage within tolerance, set ENGINE switch to START. Use DMM to measure between 24 to 28 VDC across ESS terminal 4 and engine block ground lug (EBGL). If voltage out of tolerance, replace switch (WP 0070). If voltage within tolerance, set ENGINE switch to STOP, and trace continuity from switch terminal 4 to starter solenoid trigger terminal K2S-3.

Table 2. Engine Selector Switch Function.

Terminal	Function
1	Battery (+), battle short switch
2	Alternator trigger
3	No connection
4	Starter solenoid K2 trigger
5	No connection
6	Volts DC, coolant temp, and oil pressure meter
7	No connection
8	Fuel pump, governor controller, HTS, LOPS, K7, K4
9	Fault lights
10	No connection
11	Battery charger
12	Glow plug solenoid K3S-3 trigger.

6	Engine turns over slowly	Low/bad batteries	Set BATTERY SWITCH to OFF. Attach generator NATO slave receptacle to vehicle or trailer and attempt to start.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
6 (cont.)	Engine turns over slowly	Low/bad batteries	If engine turns over normally, test batteries by measuring across battery terminals using DMM. If measurement is: < 24 VDC – Recharge batteries (WP 0023). 24 to 28 VDC - Replace batteries (WP 0041). If engine does not turn over normally, check slave vehicle for proper voltage and connections. If engine still does not turn over normally, replace starter (WP 0053). Contact next level of maintenance.
7	Engine cranks but does not start	EMERGENCY STOP button	Verify that EMERGENCY STOP button is not pushed in by twisting clockwise 1/8 turn.
		Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel (WP 0040) and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Connections	Check electrical connections for damaged wires, loose connections, corrosion on connectors. If necessary tighten, clean, or reconnect.
		Interrupted fuel flow	Inspect fuel lines for damage or leaks. Tighten lines if necessary, and restart system (WP 0005). Inspect fuel filter for debris or contamination. If necessary, replace filter, replace fuel in fuel tank, and restart engine.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
7 (cont.)	Engine cranks but does not start	Interrupted fuel flow	Check fuel pump operation as follows: 1. Turn ENGINE switch to RUN. 2. Listen & feel for fuel pump operation. 3. If not operating, remove electrical connection. 4. Turn ENGINE switch to RUN. 5. Using a DMM, measure for 24 to 28 VDC at terminals. If voltage is not present, contact next level of maintenance. 6. If voltage is present, reconnect terminals to fuel pump and loosen fuel return line. 7. Turn ENGINE switch to RUN and observe fuel flow out of fuel line. If no fuel flow, replace fuel pump (WP 0047). **NOTE** If pump operates but ambient temperature is below 0°F (-17.77 °C) proceed to fuel line icing troubleshooting (see below). 8. If no operation is detected, use a DMM to measure ground continuity to fuel pump. 9. If no operation is detected and fuel pump ground is good, use DMM to measure between 24 to 28 VDC from wire #29 to EBGL. 10. If voltage within tolerance, replace fuel pump (WP 0047).

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
7 (cont.)	Engine cranks but does not start	Interrupted fuel flow	11. If voltage out of tolerance, proceed to electrical control malfunction (see below). Check fuel line connections as follows: 1. Remove fuel return line from fuel injector rail. Set ENGINE switch to RUN. Observe fuel discharge. 2. If fuel observed, check for clogged fuel injectors. If injectors clean, check governor and engine actuator operation (see below). 3. If no fuel is observed, disconnect fuel line from fuel injector pump rail. Observe fuel discharge.
		Frozen fuel line	If fuel is observed, clear obstruction from injector pump rail. If no fuel present, check for frozen or clogged fuel line. Inspect fuel filter for frozen/jelled fuel. Replace filter if frozen. Set FUEL LINE HEATER switch to ON. Use DMM to measure between 24 to 28 VDC across the fuel line heater terminals. If within tolerance, set ENGINE HEATER switch to ON and thaw frozen fuel lines. Restart engine when engine block warm. Use DMM to verify ground continuity at heater solenoid ground K4S-2.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
7 (cont.)	Engine cranks but does not start	Frozen fuel line	Use DMM to measure between 24 to 28 VDC across trigger (K4S-3) and EBGL terminal (K4S-2). If out of tolerance, replace solenoid K4 (WP 0052) or heater switch SW8 (WP 0070). If within tolerance, use DMM to measure between 24 to 28 VDC across power –in (K4S-1) and EBGL terminal (K4S-2). If within tolerance, replace solenoid K4 (WP 0052) or fuel line heater (WP 0084). If out of tolerance, replace solenoid K4, fuel line heater, or heater circuit breaker CB (WP 0052).
		Glow plug solenoid bad (Glow plug solenoid (K3) located near starter)	Turn BATTERY SWITCH to ON. Using DMM, measure input terminal (1) on K3 solenoid for 24 to 28 VDC (see Figure 1). If 24 to 28 VDC not present, check electrical connections. If necessary tighten, clean, or re-connect. Using DMM, check ground connection terminal (2) on K3 solenoid for continuity to engine ground (see Figure 1). If continuity is not present, check electrical connections. If necessary tighten, clean, or reconnect. Hold ENGINE switch to PREHEAT. Using DMM, measure trigger terminal (3) on K3 solenoid for 24 to 28 VDC (see Figure 1).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
7 (cont.)	Engine cranks but does not start	Glow plug solenoid bad (Glow plug solenoid (K3) located near starter)	If voltage is not present, check electrical connections from start switch. Contact next level of maintenance. Check terminal (4) on K3 solenoid for 24 to 28 VDC (see Figure 1). If no voltage present, replace solenoid. Test for 24 to 28 VDC at glow plug connector strip. If no voltage is present, contact next level maintenance. Turn BATTERY SWITCH to OFF. Check electrical connections to connecting strip and glow plugs for damaged wire, loose connections, and corrosion on connectors. If necessary tighten, clean, or re-connect. Disconnect connector strip. Remove individual glow plug(s). Using DMM, test glow plug resistance. If resistance is not between 3Ω and 4Ω, replace glow plugs (WP 0049). Use DMM to verify ground continuity to glow plug solenoid terminal K3S-2. Hold ENGINE switch to PREHEAT. Using DMM, measure between 24 to 28 VDC across trigger (K3S-3) and EBGL terminal (K3S-2). If voltage not within tolerance, check for voltage across ESS switch terminal 12 and EBGL. . Isolate fault to switch or solenoid.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
7 (cont.)	Engine cranks but does not start	Diesel speed sensor malfunction	Disconnect terminals of diesel speed sensor. Loosen lock-nut on diesel speed sensor, and remove diesel speed sensor (WP 0054). Inspect diesel speed sensor port and verify that flywheel tooth is centered in speed sensor port (Figure 2).

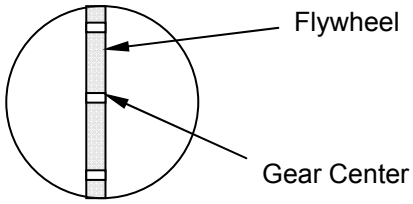

Figure 2. Flywheel Location in Speed Sensor Port

			Insert diesel speed sensor and gently tighten by hand until diesel speed sensor makes contact with fly wheel (resistance is felt) then back off 1/8 to 1/4 turn and tighten lock nut. Turn BATTERY SWITCH to ON. Crank engine, test for 2.5 VAC to 5.0 VAC at terminals. If no voltage, replace diesel speed sensor (WP 0054). If less that 2.5 VAC: Hold diesel speed sensor to prevent movement and loosen lock nut. Turn diesel speed sensor Counter-Clock wise 1/16 to 1/8 turn and tighten lock-nut. Crank engine, test for 2.5 VAC to 5.0 VAC at terminals. Contact next level of maintenance.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
7 (cont.)	Engine cranks but does not start	Governor, engine actuator, or speed sensor	If voltage at solenoid trigger K3S-3 is within tolerance isolate to solenoid or glow plug. Replace faulty component. Check engine actuator for loose or missing connections. If no physical damage evident verify governor linkage can move freely by hand. Hold ENGINE switch to START. Use hand to move linkage, so as to control speed manually. Perform governor control adjustment (WP 0081). If governor cannot be adjusted, set ENGINE switch to OFF. Use a DMM to verify continuity between EMERGENCY STOP switch and governor control terminal 5. If no continuity, with stop released. Replace switch (WP 0072). Set ENGINE switch to RUN. Use a DMM to measure for 24 to 28 VDC between governor control terminals 1 and 2. If not within tolerance proceed to electrical control malfunction (see below). If within tolerance, start engine by controlling linkage manually. Use a DMM to measure greater than 2.0 VDC across governor controller speed sensor terminal 3 and ground terminal 2. If voltage greater than 2.0 VDC isolate to actuator or governor controller. Replace faulty component.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
7 (cont.)	Engine cranks but does not start	Electrical control malfunction	If voltage not within tolerance isolate to speed sensor or governor controller. Replace faulty component. Set ENGINE switch to RUN. Activate BATTLE SHORT switch to bypass fault system relays, (Figure 1). Use a DMM to measure for 24 to 28 VDC between governor control terminals 1 and 2. If within tolerance, isolate to stuck open relay (K4, K5, K6) or switch (ESS). If not within tolerance, use process of elimination to isolate node to shorted governor controller, fuel pump, or relay.

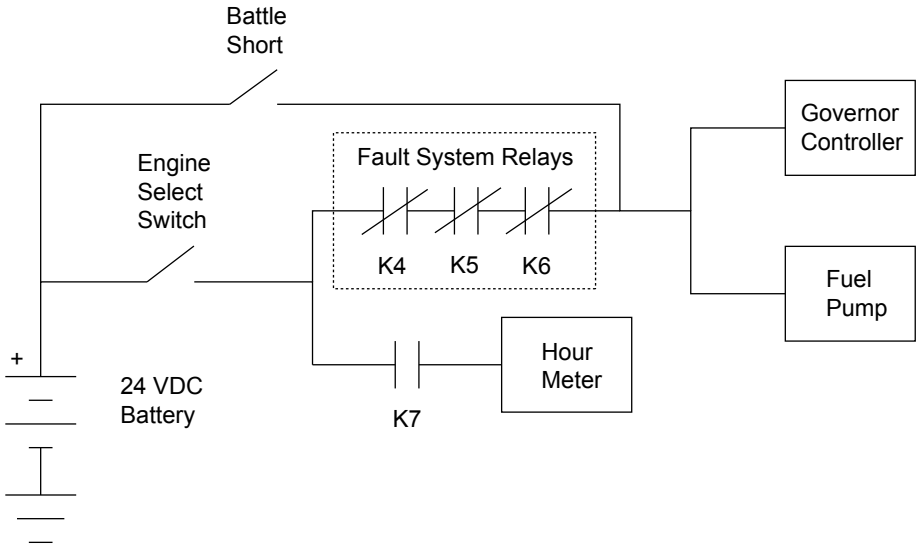

Figure 3. Genset Fault System.

8	Engine stops (no warning lights)	EMERGENCY STOP button engaged Fuse blown	Reset EMERGENCY STOP switch by twisting clockwise 1/8 turn. Set BATTERY SWITCH to ON. Set ENGINE switch to RUN.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
8 (cont.)	Engine stops (no warning lights)	Fuse blown	Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Interrupted fuel flow	Inspect fuel lines for damage or leaks. Inspect fuel filter for debris or contamination. If necessary, replace filter (WP 0044), replace fuel in fuel tank, and restart engine. Check fuel pump operation as follows: 1. Turn ENGINE switch to RUN. 2. Listen & feel for fuel pump operation. 3. If not operating, remove electrical connection. 4. Turn ENGINE switch to RUN. 5. Using a DMM, measure for 24 to 28 VDC at terminals. If voltage is not present, contact next level of maintenance. 6. If voltage is present, reconnect terminals to fuel pump and loosen fuel return line. 7. Turn ENGINE switch to RUN and observe fuel flow out of fuel line. If no fuel flow, replace fuel pump (WP 0047). Proceed to trouble shoot interrupted fuel flow malfunction, (Item 7) above.
		Connections (on diesel speed sensor or actuator)	Check electrical connections for damaged wires, loose connections, corrosion on connectors. If necessary tighten, clean, or re-connect.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
8 (cont.)	Engine stops (no warning lights)	Diesel speed sensor malfunctioning	Disconnect terminals of diesel speed sensor. Loosen lock-nut on diesel speed sensor, and remove diesel speed sensor (WP 0054). Inspect diesel speed sensor port and verify that flywheel tooth is centered in speed sensor port (Figure 2). Crank engine, test for 2.5 VAC to 5.0 VAC at terminals. If no voltage, replace diesel speed sensor (WP 0054). If less that 2.5 VAC: Hold diesel speed sensor to prevent movement and loosen lock nut. Turn diesel speed sensor Counter-Clock wise 1/16 to 1/8 turn and tighten lock-nut. Crank engine, test for 2.5 VAC to 5.0 VAC at terminals. Proceed to trouble shoot governor, engine actuator, or speed sensor malfunction, (Item 7) above.
9	Engine stops (HIGH COOLANT TEMP light on)	Engine overheating	Check engine temperature gauge. If gauge reads above 220˚F, coolant system problem is indicated. If temperature gauge reads below 220˚F, replace engine coolant temperature sensor (WP 0056). Allow engine to cool. Check engine oil for signs of water contamination. If any contamination is found, discontinue use of engine and contact next level of maintenance. Inspect coolant level. If level is low, replenish fluid.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
9 (cont.)	Engine stops (HIGH COOLANT TEMP light on)		Inspect coolant system for signs of leaking. If any leaks found, conduct coolant leaking troubleshooting procedures. Inspect radiator for signs of leaking. If any leaks found, replace radiator (WP 0059). Inspect radiator cooling fins for damage or blocked with debris. If fins are crushed, use a comb to straighten them. If dirty, allow to cool then clean with low pressure water. Inspect engine cooling fan and belt for damage. If damaged, replace (WP 0062 and WP 0061). Check if re-circulated exhaust gas or engine air is occurring by clearing obstructions from louvers and repositioning trailer for better circulation. Check for clogged air inlet or exhaust outlet. Clear debris if blocked. Verify generator A-C Kilowatts meter doesn't exceed 18 kW. Decrease generator load if overloaded. Verify generator load is balanced for all three phase legs. If unbalanced, turn off all peripheral equipment and restart generator. Monitor each phase leg on A-C Amperes meter as equipment is turned on. Isolate failure to load or genset.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
9 (cont.)	Engine stops (HIGH COOLANT TEMP light on)		If engine oil is contaminated with coolant or other internal mechanical engine component failure is evident from Service troubleshooting replace engine (WP 0086). Remove cover from generator and disconnect generator from engine (WP 0086). Rotate generator manually to ensure free rotation. Replace generator if damage evident (bearings binding, shaft bent).
		Engine thermostatic switch	**NOTE** Before replacing thermostat or water pump, ensure thermostatic switch is operating properly. If no signs of leaking are apparent, replace thermostat (WP 0057). Restart engine. If engine overheats again, replace water pump (WP 0063). If condition persists, contact next level of maintenance. Allow engine to cool. Disconnect wiring from thermostatic switch and tape ends so they touch. Test for continuity across switch terminals. If switch is open, replace switch (WP 0056). Start engine. If HIGH COOLANT TEMP light illuminates and system shuts down, contact next level of maintenance. Continue to test for continuity across switch. If switch opens prior to engine reaching normal operating temperature, replace switch (WP 0056).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
9 (cont.)	Engine stops (HIGH COOLANT TEMP light on)	Engine thermostatic switch	Engine must be cool before proceeding. Set ENGINE switch to OFF. Bypass thermostatic switch as in Service Troubleshooting. Swap overheat relay K4 with over speed relay K5. Start engine, if engine shuts down for over speed fault replace relay. If engine still shuts down for overheat fault, replace governor control relay K7 or time delay relay TDM.
10	Engine stops (LOW OIL PRESSURE light on)	Engine oil pressure low	Check engine oil level. Add oil, if necessary (WP 0022). If any leaks found, conduct oil leaking troubleshooting procedures. Start engine and monitor oil pressure. If oil pressure does not rise, LOW OIL PRESSURE light illuminates, and engine shuts down, notify next level of maintenance. If oil pressure raises above 20 psi, and engine shuts down, troubleshoot oil pressure switch. **NOTE** Operating an engine with low oil pressure can lead to serious damage. If the oil sending unit is functioning properly and the troubleshooting procedure below does not correct the failure replace the engine. Set ENGINE switch to OFF. Bypass low oil pressure switch as in Service Troubleshooting, Oil Pressure Switch. Swap low oil pressure relay K6 with over speed relay K5.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
10 (cont.)	Engine stops (LOW OIL PRESSURE light on)	Engine oil pressure low	Start engine, if engine shuts down for over speed fault replace relay. If engine still shuts down for low oil pressure fault, replace governor control relay K7 or time delay relay TDM.
		Oil pressure switch	Disconnect wiring from pressure switch and tape off so wires cannot touch Test switch terminal for continuity. If switch is closed, replace switch (WP 0050). Start engine. If switch closes once the pressure reads above 20 psi and remains closed, the switch is good. If the switch opens after the engine has achieved 20 psi, or does not close at all, replace switch (WP 0050).
		Low Oil pressure cut-off switch	Disconnect wiring from low oil pressure switch and tape off so wires cannot touch. Test switch terminals for continuity. If switch is closed, replace switch (WP 0046). Start engine. If pressure reads below 20 psi and switch opens, the switch is good. If switches test good, notify next level of maintenance.
11	Engine stops (OVERSPEED light on)	Contaminated fuel/fuel filter	Remove fuel filter, inspect fuel for signs of MOGAS. If any MOGAS contamination is suspected, replace the fuel filter, drain, and refill fuel tank with clean fuel (WP 0044). If condition continues, contact next level of maintenance.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
11 (cont.)	Engine stops (OVERSPEED light on)	Speed switch or over speed relay	Start engine and monitor HERTZ meter. Overspeed frequency switch is set to trip at 64 Hz. If engine shutdown occurs at 64 Hz perform governor adjustment (WP 0081). Set ENGINE switch to OFF. Swap over speed relay K5 with high temperature relay K4. Start engine, if engine shuts down for high temperature fault replace relay. Set ENGINE switch to OFF then RUN to clear faults. Verify inputs to speed switch. Use DMM to measure between 24 to 28 VDC across switch terminal 1 (power) and terminal 2 (ground). Use DMM to measure ground continuity from EBGL to terminal 2 (ground). Measure an open between terminals 11 and 12. Replace speed switch (WP 0080).
12	Engine emits white smoke from exhaust	Contaminated fuel/fuel filter	Remove fuel filter, check for dirt, obstructions, or contaminated fuel. Replace filter (WP 0044) and/or fuel. Check fuel quality, replace fuel if inferior quality. Check engine oil for proper level. If level is overfull, drain off excess oil and restart engine. Replace engine (WP 0086).
13	Engine emits blue smoke from exhaust	Engine oil level over full	Check engine oil for proper level. If level is overfull, drain off excess oil and restart engine. If engine oil level is correct, or blue smoke persists, check for coolant in oil. Replace engine (WP 0086).

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
14	Engine emits heavy black smoke from exhaust	Clogged air filter	Remove air filter, inspect for excessive dirt or moisture. If unserviceable, replace air filter (WP 0043). Remove fuel filter, check for dirt, obstructions, or contaminated fuel. Replace filter, and/or fuel (WP 0044). Contact next level of maintenance.
		Fuel injection system defective	Check fuel injectors for dirt and clogging (WP 0048). Clean or replace fuel injectors, if problem not corrected replace engine (WP 0086).
15	Excessive carbon deposits on exhaust outlet	Blocked or obstructed muffler/exhaust pipe	Remove muffler exhaust pipe and check for dirt or other obstructions. Clean or replace muffler (WP 0065).
		Exhaust pipe damaged or excessively corroded	Remove exhaust pipe and inspect. If damaged or excessively corroded, replace (WP 0065).
		Contaminated fuel/fuel filter	Remove fuel filter, check for dirt, obstructions, or contaminated fuel. Replace filter, and/or fuel (WP 0044). Adjust governor controller (WP 0081). If adjustment doesn't correct the problem replace engine (WP 0086). Contact next level of maintenance.
16	Engine temperature remains below 120°F (48.88°C)	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
16 (cont.)	Engine temperature remains below 120°F (48.88°C)	Coolant temperature sensor inoperable	Replace coolant temperature sensor (WP 0055).
		Thermostat stuck open	Replace thermostat (WP 0057) and monitor COOLANT TEMP gauge on control panel.
		COOLANT TEMP gauge inoperative	Replace COOLANT TEMP gauge (WP 0069).
17	AC KILOWATTS meter reads 0 with Genset under load	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN.
		AC KILOWATTS meter bad or out of calibration.	Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040). Replace AC KILOWATTS meter (WP 0068).
18	DC VOLT meter reads below 28 VDC while Genset is running	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Fan belt out of adjustment excessively worn or damaged	Perform fan belt adjustment or if necessary, replace (WP 0061).
		Alternator output out of tolerance	Set BATTERY SWITCH to ON. Start engine. Verify alternator is operational. Using DMM, measure output terminal lug mounted on the alternator. If alternator output is below 27 VDC or above 32 VDC, replace alternator (WP 0060). Verify battery charger is operational. Shut down engine and set CB2 to OFF.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
18 (cont.)	DC VOLT meter reads below 28 VDC while Genset is running	Alternator output out of tolerance	Use DMM to measure ground continuity between battery negative terminal and battery charger GND terminal. Connect battery charger cable to J5 and use an external source to run the battery charger. Use DMM to measure 120 VAC +/- 10% between battery charger L and N terminals. Replace battery charger (WP 0083) if out of tolerance. Use DMM to measure between 24 and 28 VDC across pins + and – of battery charger. Replace battery charger (WP 0083) if out of tolerance. If within tolerance, and DC VOLT meter reads out of tolerance replace DC VOLT meter (WP 0068). If within tolerance verify battery charger is operational when generator provides AC power. Disconnect battery charger cable from J5. Start genset and allow it to reach normal operating condition. Set BATTERY SWITCH to ON and disconnect any cable at J6. Disconnect any load connected to light/utility connector J2 and set circuit breaker CB2 to ON. Use a DMM to measure between 24 to 28 VDC across pins + and – of battery charger. If within tolerance switch load removed from J2 (phase 1) to J3 (phase 2). If out of tolerance replace battery charger (WP 0083).

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
		NOTE At high ambient temperatures the COOLANT TEMP gauge temp can read 230° F (110°C) normally.	
19	Engine temperature above 220°F (104.4°C), engine still running		Set BATTERY SWITCH to ON. Set ENGINE switch to RUN.
		Fuse blown	Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Faulty component	Replace thermostatic switch (WP 0056). Start engine. If engine shuts down/overheats, conduct troubleshooting procedure for engine shuts down (HIGH COOLANT TEMP light on).
20	Engine oil pressure below 20 psi, engine still running	**NOTE** At high ambient temperatures the OIL PRESSURE gauge temp can read 15 psi normally.	
			If engine does not shut down, replace temperature sensor (WP 0055). Contact next level of maintenance. Set BATTERY SWITCH to ON. Set ENGINE switch to RUN.
		Fuse blown	Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
			Check engine oil level. If necessary, add oil (WP 0042).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
20 (cont.)	Engine oil pressure below 20 psi, engine still running	Faulty component	Start engine and observe OIL PRESSURE gauge. If oil pressure does not come up to proper level (20 psi), replace pressure switch (WP 0050). Start engine and observe OIL PRESSURE gauge. If oil pressure does not come up to proper level (20 psi),replace oil pressure sending unit (WP 0051). Replace oil pressure gauge (WP 0069). If oil pressure does not reach normal operating level replace engine (WP 0086).
		NOTE The fault code is determined by the number of times the AUXILIARY HEAT switch flashes (i.e. one flash is F01, two flashes is F02, etc.). <u>Internal Safety Cut Off Switch Reset Procedure:</u> 1. Set ENGINE HEATER switch to OFF. 2. Set ENGINE switch to OFF. 3. Set BATTERY SWITCH to OFF. 4. Set BATTERY SWITCH to ON. 5. Set FUEL LINE HEATER switch to ON.	
21	Engine heater (hydronic) will not start (no fault code)	Power or control line interrupted.	Inspect all electrical connections and wire for damage and connectivity. Ensure BATTERY and ENGINE HEATER switches are set to ON. Test for 24 to 28 VDC between heater terminal A-5 (wire # GN) and terminal F-1 (wire # RD4). If not within tolerance, ensure BATTERY and ENGINE HEATER switches are set to ON. Use DMM to verify ground continuity from EBGL to heater terminals X2-2(wire #409) and X1-5 (wire # GN).

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
21 (cont.)	Engine heater (hydronic) will not start (no fault code)	Power or control line interrupted.	Test for between 24 to 28 VDC at heater terminal X2-1 (wire #RD4) and X1-2 (wire #YL). Use wire #409 as ground reference. If not within tolerance isolate to engine heater or ENGINE HEATER switch SW6. Replace faulty component. Contact next level of maintenance.
		Fuse blown	Remove cover from engine heater (hydronic) fuse block. Remove fuses and inspect. Replace if necessary (WP 0064). Contact next level of maintenance.
		Fuse blown repeatedly	Inspect electrical connections for shorted wires at input terminals. Replace heater (WP 0064).
22	Engine heater (hydronic) (fault code F01 or F02)	Fuel source interrupted	Verify fuel level. Add fuel, if necessary. Inspect fuel line for damage or loose connections. If loose, tighten and restart. If damaged, replace fuel lines (WP 0085).
		Fuel filter clogged	Remove and inspect fuel filter for debris (WP 0044). If filter is clogged, replace filter (WP 0044).
		Fuel pump inoperable	Perform Internal Safety Cut Off Switch Reset Procedure. Turn on engine heater (hydronic), listen for fuel pump operation. If pump does not operate after 15 seconds.

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
22 (cont.)	Engine heater (hydronic) (fault code F01 or F02)	Fuel pump inoperable	Disconnect cable at fuel pump, and test for 24 to 28 VDC. If voltage is between 24 and 28 VDC, replace fuel pump. If no voltage is present, check fuse, replace if necessary (WP 0064). If voltage is still not present, replace engine heater (hydronic) (WP 0064). Contact next level of maintenance.
23	Engine heater (hydronic) (fault code F03)	Battery voltage not within acceptable limits	Check battery voltage. If less than 24 VDC, recharge batteries (WP 0023) or attach slave vehicle. Perform Internal Safety Cut Off Switch Reset Procedure. Check battery voltage. If greater than 32 VDC, troubleshoot batteries. If battery voltage is 20 to 30 VDC, replace engine heater (hydronic) (WP 0064).
24	Engine heater (hydronic) (fault code F04, F05, F06, F08, F09)		Replace engine heater (hydronic) (WP 0064).
25	Engine heater (hydronic) (fault code F07)	Fuel pump wiring damaged	Repair damaged wiring.
		Fuel pump inoperable	Perform Internal Safety Cut Off Switch Reset Procedure. Turn on engine heater (hydronic), listen for fuel pump operation. If pump does not operate after 15 seconds, disconnect cable at fuel pump, and test for 24 to 28 VDC. If voltage is between 24 and 28 VDC, replace fuel pump (WP 0064). Replace heater (WP 0064).
26	Engine heater (hydronic) (fault code F010)	Flow restriction	Inspect coolant line for damage, loose connections or restriction (i.e., clogging, bends, kinks).

Table 1. Field Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
26 (cont.)	Engine heater (hydronic) (fault code F010)	Flow restriction	If loose, tighten and restart. If bent or kinked, undo and restart. If damaged, contact next level of maintenance. Inspect coolant line for damage or restriction (i.e., clogging, bends, kinks). If damaged/restricted, replace coolant line (WP 0064).
		Circulation pump bad.	Replace engine heater (hydronic) (WP 0064). Use DMM to measure between 24 to 28 VDC across heater terminal X1-1 (wire # BK) and X1-5 (wire # GN). If within tolerance replace heater (WP 0064). If not within tolerance isolate to heater or heater switch SW6. Replace faulty component.

NOTE

When ENGINE HEATER switch (on Genset control panel) flashes, there is a problem with the Engine heater (Hydronic). The number of flashes indicates a specific fault code (i.e., one flash is F01, two flashes is F02).

There is a sequence of slow and fast flashes. Count the slow flashes.

Table 3. Engine Heater (Hydronic) Fault Codes.

FAULT CODE	DESCRIPTION	POSSIBLE CAUSE
F01	No Start-up	• Fuel Supply • Restricted Air Flow Through Intake or Exhaust
F02	Flame Extinguished	• Fuel Supply • Restricted Air Flow Through Intake or Exhaust
F03	Under/Over voltage	• Vehicle Charging System.
F04	Premature Flame Detection	• Heater faulty
F05	Circulating Pump Interruption or Short Circuit	• Open or Shorted Wiring • Defective Pump
F06	Temperature Sensor Interruption or Short Circuit	• Heater faulty
F07	Metering Pump (Fuel pump) Interruption or Short Circuit	• Open or Shorted Wiring
F08	Combustion Fan Motor Interruption, Short Circuit or Incorrect fan Speed	• Heater faulty
F09	Pencil Type Glow Plug/Flame Detector Interruption or Short Circuit	• Heater faulty
F10	Overheating Condition	• Coolant Flow Restriction • Circulation Pump

END WORK PACKAGE

MAINTAINER TROUBLESHOOTING PROCEDURES
TMSS-MED
ECU (ELECTRICAL)/HYDRONIC HEATER

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Multimeter (WP 0165, Item 2)

Personnel Required
Two

References
WP 0003, WP 0005, WP 0031, WP 0064, WP 0085, WP 0092, WP 0095 thru WP 0099, WP 103 thru 108, WP 0113

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the TMSS-MED by maintainer-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the TMSS-MED. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

There are two different circuit designs for the ECU control panel. Refer to (WP 0003) for a brief explanation of the differences.

Refer to (Figures FO-1 and FO-2) for schematic and wiring diagram of Version 1 of the ECU.

Refer to (Figures FO-3 and FO-4) for schematic and wiring diagram of Version 2 of the ECU.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	ECU will not run on GENSET power	ECU circuit breaker tripped	Disconnect power source from ECU. Open ECU control panel. Inspect circuit breaker(s) (Figures 1 or 2). If tripped, reset and test system. If circuit breaker(s) (Figures 2 or 3) trip again, contact next level of maintenance.
		Power interrupted at source Green POWER light not lit or dim	Verify that: • Proper connections are made (WP 0005). • Genset power operational. • Circuit breaker(s) (Figures 1 or 2) do not need reset. • Proper voltage present.
		Voltage out of phase POWER OUT OF PHASE light lit	Operate ECU on shore power to ensure ECU is operating properly. Disconnect power cable from Genset and reconnect.
		High pressure switch out	Locate high pressure out switch inside of ECU (near rear condenser chamber) and depress red RESET switch. If high pressure switch out trips within 30 minutes, contact next level of maintenance. Contact next level of maintenance.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
2	ECU will not run on shore power	Condenser coil dirty	Inspect condenser coil for dirt and debris. If dirty, clean (WP 0092).
		ECU circuit breaker tripped	Disconnect power source from ECU. Open ECU control panel. Inspect circuit breaker(s) (Figures 1 or 2). If tripped, reset and test system. If circuit breaker(s) (Figures 1 or 2) trip again, contact next level of maintenance.
		Power out of phase Red POWER OUT OF PHASE light lit	Indicates incorrect wiring connection. Turn off shore power. Disconnect pig tail from power source. Change order of connections and reconnect. Turn on shore power. If POWER OUT OF PHASE light is lit, change order of connections again. If problem persists, contact next level of maintenance.
		Internal fault in system	Contact next level of maintenance.
3	ECU won't run in any mode	CB keeps tripping	Use schematic to identify load connected to circuit breaker. Proceed to CONDITION/INDICATION below for isolation routine.
		Phase Sense Relay (PSR) or TX1 bad	Actuate CB1 and CB2.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
3 (cont.)	ECU won't run in any mode	Phase Sense Relay (PSR) or TX1 bad	If CB2 trips, shutdown power at the source and disconnect ECU power cable at connector J1 of Genset control panel. Use continuity measurements to isolate short to PSR or TX1. Replace PSR (WP 0106) or TX1 (WP 0107). If CB1 trips, shutdown power at the source and disconnect the ECU power cable at connector J1 of the Genset control panel. Use process of elimination to isolate short to EMSP or HM. Replace EMSP (WP 0108) or HM (WP 0103). If POWER OUT-OF-PHASE light lit replace PSR (WP 0106).
		POWER ON LIGHT (POL) bad	Use multimeter to measure between 22 to 26 VAC across transformer terminals X1 and X2. If not within tolerance, use process of elimination to isolate failure to bridge rectifier BR, transformer TX1, fuel pump FP, or auxiliary heater. Replace bridge rectifier BR (WP 0107), transformer TX1 (WP 0107), fuel pump FP or auxiliary heater (WP 0094). Use multimeter to measure between 22 to 26 VAC across POL, wire #34B and #33D. Replace POL (WP 0103) if within tolerance. Replace CB1 (WP 0104) if not within tolerance.
		MSS switch, PSR, or evaporator fan bad	Ensure CB1 and CB2 are actuated. Set MSS switch to FAN. If evaporator fan does not start, use multimeter to measure between 22 to 26 VAC across fan hot (terminal A1) (wire # 37C) and fan neutral (terminal A2) (wire # 33G).

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
3 (cont.)	ECU won't run in any mode	MSS switch, PSR, or evaporator fan bad	If within tolerance, proceed to Item 5 CONDITION/INDICATION to isolate evaporator fan failure. Use multimeter to measure between 22 to 26 VAC across MSS source (wire # 36A) and fan neutral (wire #33G). If within tolerance replace MSS switch (WP 0103). If not within tolerance replace PSR (WP 0106).
4	ECU won't run in cool mode	MSS switch	Ensure CB1, CB2, and CB3 are actuated. Set MSS switch to COOL. Adjust thermostat to lowest setting. If evaporator fan is not operating proceed to Item 5 CONDITION/INDICATION for isolation routine. If condenser fan is not operating proceed to Item 6 CONDITION/INDICATION for isolation routine. If compressor is not operating proceed to Item 7 CONDITION/INDICATION for isolation routine. Proceed to (WP 0031) to troubleshoot ECU cooling function.
5	ECU won't run in HEAT mode. (V1)	Thermostat, High Temperature Cutout (HTC), or MSS bad	Ensure CB1, CB2, and CB3 are actuated. Set MSS switch to HEAT. Adjust thermostat to highest setting. If evaporator fan is not operating proceed to Item 5 CONDITION/INDICATION for isolation routine.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
5 (cont.)	ECU won't run in HEAT mode. (V1)	Thermostat, High Temperature Cutout (HTC), or MSS bad	Use multimeter to measure between 22 to 26 VAC at thermostat output wire #40 and neutral terminal board contact (TB-2). If within tolerance proceed to troubleshoot heater coil/contactor below. Use multimeter to measure between 22 to 26 VAC at terminal board contact TB-4 and neutral terminal board contact (TB-2). If within tolerance, replace thermostat and sensor (WP 0103). If not within tolerance, use multimeter to measure between 22 to 26 VAC at terminal board contact TB-3 and neutral terminal board contact (TB-2). If within tolerance, replace HTC switch (WP 0095). If not within tolerance replace MSS switch (WP 0103).
		Heater coil/contactor bad	Use multimeter to measure 190 to 230 VAC at terminals T1 to T2 and T3 to T2 on contactor CHT. If both measurements are within tolerance, refer problem to next level of maintenance. If either measurement is out of tolerance, replace CHT (WP 0105). Contact next level of maintenance.
6	ECU won't run in HEAT HIGH (or HEAT LOW) mode (V2)	Thermostat, High Temperature Cutout (HTC), or MSS bad	Ensure CB1, CB2, CB4, and CB5 are actuated. Set MSS switch to HEAT HIGH (or HEAT LOW). Adjust thermostat to highest setting.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
6 (cont.)	ECU won't run in HEAT HIGH (or HEAT LOW) mode (V2)	Thermostat, High Temperature Cutout (HTC), or MSS bad	If evaporator fan is not operating proceed to Item 5 CONDITION/INDICATION for isolation routine. Use multimeter to measure between 22 to 26 VAC across thermostat output (wire #40A) and terminal board contact TB-2. If within tolerance proceed to troubleshoot heater coil/contactor below. Use multimeter to measure between 22 to 26 VAC across terminal contacts TB-4 and TB-2. If within tolerance, replace thermostat and sensor (WP 0103). If not within tolerance, use multimeter to measure between 22 to 26 VAC across terminal contacts TB-3 and TB-2. If within tolerance, replace HTC switch (WP 0095). If not within tolerance replace MSS switch (WP 0104).
		HIGH HEAT heater coil/contactor bad	For HEAT HIGH mode, use multimeter to measure between 190 to 230 VAC at terminals T1 to T2 and T3 to T2 on contactor CHT HIGH. If both measurements are within tolerance refer to next level of maintenance. If either measurement is out of tolerance, replace CHT HIGH (WP 0105). Contact next level of maintenance.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
6 (cont.)	ECU won't run in HEAT HIGH (or HEAT LOW) mode (V2)	LOW HEAT heater coil/contactor bad	For LOW HEAT mode, use multimeter to measure 190 to 230 VAC at terminals T1 to T2 and T3 to T2 on contactor CHT LOW. If both measurements are within tolerance refer to next level of maintenance. If either measurement is out of tolerance, replace CHT LOW (WP 0105). Contact next level of maintenance.
7	Evaporator fan does not operate	Damaged/loose fan belt	Inspect evaporator fan belt. If too loose/tight adjust. If damaged, replace (WP 0098).
		ECU circuit breaker tripped	Disconnect power source from ECU. Open ECU control panel. Inspect circuit breaker(s) (Figures 1 or 2). If tripped, reset and test system. If circuit breaker(s) (Figures 1 or 2) trip again, contact next level of maintenance. Contact next level of maintenance.
		Evaporator Motor Starter Protector EMSP tripped	Ensure CB1 and CB2 are actuated and MSS switch is set to FAN. Use multimeter to measure between 22 to 26 VAC across EMSP terminal A1 (wire #37C) and terminal A2 (wire 33G). If not within tolerance, shutdown power and use continuity measurements to verify wiring from MSS to EMSP. Replace faulty component. **NOTE** Allow EMSP to cool down before attempting to reset. Manually reset EMSP if tripped.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
7 (cont.)	Evaporator fan does not operate	Power interrupted at source.	If resetting starter protector does not correct failure use multimeter to measure between 190 to 230 VAC at terminals T1 to T2 and T3 to T2 on the EMSP. If both measurements are within tolerance replace evaporator fan motor (WP 0096). If either measurement is out of tolerance, replace EMSP (WP 0108) or evaporator fan motor (WP 0096).
8	Condenser fan does not operate	Damaged/loose fan belt	Inspect evaporator fan belt. If too loose/tight adjust. If damaged, replace (WP 0098).
		ECU circuit breaker tripped	Disconnect power source from ECU. Open ECU control panel. Inspect circuit breaker(s) (Figures 1 or 2). If tripped, reset and test system. If circuit breaker(s) (Figures 1 or 2) trip again, contact next level of maintenance. Contact next level of maintenance.
		MSS switch bad	Ensure CB1, CB2, and CB3 are actuated. Ensure MSS switch is set to COOL and thermostat is set to lowest setting. Use multimeter to measure between 22 to 26 VAC across MSS wire #41A and neutral terminal board contact TB-2. If not within tolerance replace MSS switch (WP 0104).

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
8 (cont.)	Condenser fan does not operate	MSS switch bad	If within tolerance, use multimeter to measure between 22 to 26 VAC across CMSP wire #41D and neutral terminal board contact TB-2.
		Condenser Motor Starter Protector CMSP tripped	If not within tolerance shutdown ECU and use continuity measurements to verify path between MSS and CMSP. Replace faulty component. **NOTE** Allow CMSP to cool down before attempting to reset. Manually reset CMSP if tripped.
		Power interrupted at source	If resetting starter protector does not correct failure use multimeter to measure between 190 to 230 VAC at terminals T1 to T2 and T3 to T2 on the CMSP. If both measurements are within tolerance replace condenser fan motor (WP 0097). If either measurement is out of tolerance, replace CMSP (WP 0108) or condenser fan motor (WP 0097).
9	Compressor won't run	Power interrupted at source	Ensure CB1, CB2, and CB3 are actuated. Ensure MSS switch is set to COOL and thermostat is set to lowest setting. Use multimeter to measure between 190 to 230 VAC at terminals T1 to T2 and T3 to T2 on compressor. If both measurements are within tolerance, proceed to POSSIBLE MALFUNCTION Compressor/TDR bad for isolation routine.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
9 (cont.)	Compressor won't run	Power interrupted at source	Use multimeter to measure between 190 to 230 VAC at terminals T1 to T2 and T3 to T2 on Power Distribution Block 2 (PDB2). If either measurement is not within tolerance, shutdown ECU and use continuity measurements to isolate to CB3, compressor, CCR, or CHT.
		Compressor contactor (CCR) tripped	**NOTE** Allow CCR to cool down before attempting to reset. Manually reset CCR if tripped. If resetting CCR does not correct problem replace contactor (WP 0105) or compressor (WP 0099).
		Compressor/Time Delay Relay (TDR) bad	Use multimeter to measure between 22 to 26 VAC across terminal board contacts TB-7 and TB-2. If not within tolerance proceed to CONDITION/ INDICATION step 8 below and verify pressure switches. Use multimeter to measure between 22 to 26 VAC at CCR wire #45 and negative lead to neutral terminal TB2. If not within tolerance replace TDR. Set MSS switch to OFF. Attach multimeter probe positive lead to wire #45 at compressor and negative lead to neutral terminal TB2. Monitor multimeter to verify 15 second turn-on time delay for the next step. Set MSS switch to COOL.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
9 (cont.)	Compressor won't run	Compressor/Time Delay Relay (TDR) bad	If multimeter reading becomes 22 to 26 VAC after approximately 15 seconds, replace compressor (WP 0099). If 15 second time delay doesn't occur after MSS set to COOL replace TDR (WP 0106).
10	Pressure switch fault	High Pressure Cutout (HPC) or Low Pressure Cutout (LPC) Switch.	**NOTE** Perform pressure test (WP 0113) before completing the next action. Ensure CB1, CB2, and CB3 are actuated. Ensure MSS switch is set to COOL and thermostat is adjusted to lowest setting. Use multimeter to measure between 22 to 26 VAC at TB6. If within tolerance replace HPC (WP 0095). If not within tolerance replace LPC (WP 0095).

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
		NOTE The fault code is determined by the number of times the AUXILIARY HEAT switch flashes (i.e. one flash is F01, two flashes is F02, etc.). Refer to (Table 2) for fault codes. If power is cut off from hydronic heater for any reason, the hydronic heater internal safety cut off switch must be reset as follows: <u>Hydronic Heater Reset Procedure</u> 1. Power down ECU. 2. Disconnect power source (i.e., Genset, shore power) from ECU for 20 seconds. 3. Reconnect power source. Due to length of fuel line to ECU, always make two attempts when restarting.	
11	Hydronic heater will not start (no fault code)	Circuit breaker tripped	Disconnect power source from ECU. Open ECU control panel. Inspect circuit breaker(s) (Figures 1 or 2). If tripped, reset and test system. If circuit breaker(s) (Figures 1 or 2) trip again, contact next level of maintenance.
		Bad hydronic heater fuses	Replace 15 A fuse and/or 5 A fuse inside hydronic heater wiring harness (WP 0094).
		Power interrupted at source	Set CB1 and CB2 to ON. Ensure MSS switch set to OFF. Use multimeter to measure between 22 to 26 VDC across battery positive terminal X2-1 of and negative terminal X2-2 of heater, (Figure 3). If within tolerance, proceed to POSSIBLE MALFUNCTION control circuit bad for isolation routine.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
11 (cont.)	Hydronic heater will not start (no fault code)	Power interrupted at source	Use multimeter to measure between 22 to 26 VDC across bridge rectifier positive terminal (wire # 17) and negative terminal (wire #57). If within tolerance, replace fuse F2 or hydronic heater (WP 0094). If not within tolerance, replace bridge rectifier BR (WP 0092) or hydronic heater (WP 0094).
		Control circuit bad	Set Auxiliary Heat Switch (AHSS) to MAN. Use multimeter to measure between 22 to 26 VDC across ON SIGNAL terminal (X1-1) and battery negative terminal (X2-2). If within tolerance, replace hydronic heater (WP 0094) or AHSS switch (WP 0103). Use multimeter to measure between 22 to 26 VDC across CMSP wire # 51 and battery negative terminal # X2-2. If within tolerance, isolate to AHSS switch or EMSP (V2 only). Replace faulty component. If not within tolerance, isolate failure to fuse F1, starter protector CMSP, or hydronic heater. Replace faulty component.
		Heat contactor CHT (V1) or CHT LOW (V2) faulty	If hydronic heater works in MAN mode but not in AUTO mode isolate to AHSS switch or contactor CHT (V1) or CHT LOW (V2). Replace faulty component.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
12	Hydronic heater (fault code F01 or F02)	Fuel source interrupted	Inspect fuel line for damage or loose connections. If loose, tighten. Reset and restart hydronic heater. If damaged, contact next level of maintenance.
		Fuel filter clogged	Remove and inspect fuel filter for debris. If filter is clogged, replace filter (WP 0094).
		Fuel pump inoperative	Set AUXILIARY HEAT to OFF and restart hydronic heater. Reset and restart hydronic heater. Attempt to start ECU. Listen/feel for fuel pump operation. If fuel pump does not operate, disconnect wiring and test for 24 to 28 VDC. If 24 to 28 VDC present, replace fuel pump (WP 0094). If 24 to 28 VDC not present, inspect wiring harness for damage. If damaged, contact next level of maintenance.
		Hydronic heater faulty	Check fuses, if bad, replace (WP 0094). If fuses are good, replace hydronic heater (WP 0094). Replace hydronic heater (WP 0094). Contact next level of maintenance.
13	Hydronic heater (fault code F03)	Hydronic heater faulty	Set AUXILIARY HEAT to OFF and restart hydronic heater. Replace hydronic heater (WP 0094).
14	Hydronic heater (fault code F07)	Fuel source interrupted	Inspect fuel line for damage or loose connections. If loose, tighten. Reset and restart hydronic heater.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
14 (cont.)	Hydronic heater (fault code F07)	Fuel source interrupted	If fuel line damaged replace it (WP 0064). If fuel line frozen, verify fuel line heater works by actuating the Fuel Line Heater switch at the genset and feeling warmth of element.
		Fuel filter clogged	Remove and inspect fuel filter for debris. If filter is clogged, replace filter (WP 0094).
		Fuel pump inoperative	Set AUXILIARY HEAT to OFF and restart hydronic heater. Attempt to start ECU. Listen/feel for fuel pump operation. If fuel pump does not operate, disconnect wiring and test for 24 to 28 VDC. If 24 to 28 VDC present, replace fuel pump. If 24 to 28 VDC not present, inspect wiring harness for damage. Use multimeter to measure between 22 to 26 VDC across blue wire (+) and the brown (-) fuel pump wire. If within tolerance, replace fuel pump (WP 0064). If not within tolerance, replace hydronic heater or fuel pump.
		Bad hydronic heater fuses	Check fuses, if bad replace (WP 0094). If fuses are good, replace hydronic heater (WP 0094).
		Hydronic heater faulty	Replace hydronic heater (WP 0094). Contact next level of maintenance.
		Fuel contaminated	Drain and replace fuel in genset fuel tank (WP 0085).

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
15	Hydronic heater (fault code F04, F05, F06, F08, F09, F010)	Hydronic heater faulty	Replace hydronic heater (WP 0094).
16	Coolant leaking from hydronic heater/hoses	Coolant hoses leaking	Inspect all coolant hoses of hydronic heater for damage or loose clamps. Tighten clamps.
		Coolant reservoir leaking	Inspect reservoir for loose cap, leaks, loose clamps, damaged hose. If damage present, replace. Contact next level of maintenance.
		Coolant hose, reservoir, or evaporator coil bad	Shutdown ECU and allow system to cool. Wipe coolant from all surfaces. Inspect for leaks. Actuate CB1 and CB2 with MSS switch set to OFF. Set AUXILIARY HEAT switch to MANUAL. Inspect surface for leak. Allow heater to reach normal operating condition if necessary. Visually isolate source of leak and replace faulty component (WP 0064).
17	Fuel leaking from hydronic heater	Fuel filter leaking	Inspect filter for signs of leaking. If leaks are identified, replace filter (WP 0094).
		Fuel lines leaking	Inspect fuel lines for leaking, damage, or loose clamps. If clamps loose, tighten.
		Hydronic heater fuel pump leaking	If fuel pump is leaking, replace (WP 0094).
		Hydronic heater body leaking	If hydronic heater body is leaking, replace hydronic heater.

Table 1. Maintainer Troubleshooting – ECU (Electrical)/Hydronic Heater – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
17 (cont.)	Fuel leaking from hydronic heater	Fuel lines, fuel pump, fuel filter, or heater leaking	Shutdown ECU and allow system to cool. Wipe fuel from all surfaces. Inspect for leaks. Actuate CB1 and CB2 with MSS switch set to OFF. Set AUXILIARY HEAT switch to MANUAL. Inspect surface for leak. Allow heater to reach normal operating condition if necessary. Visually isolate source of leak and replace faulty component.

NOTE

When AUXILIARY HEAT switch (on ECU control panel) flashes, there is a problem with the hydronic heater. The number of flashes indicates a specific fault code (i.e., one flash is F01, two flashes is F02).

There is a sequence of slow and fast flashes. Count the slow flashes.

Table 2. ECU Hydronic Heater Fault Codes.

FAULT CODE	DESCRIPTION	POSSIBLE CAUSE
F01	No Start-up	•Fuel Supply •Restricted Air Flow Through Intake or Exhaust
F02	Flame Extinguished	•Fuel Supply •Restricted Air Flow Through Intake or Exhaust
F03	Under/Over voltage	•Vehicle Charging System
F04	Premature Flame Detection	•Heater faulty
F05	Circulating Pump Interruption or Short Circuit	•Open or Shorted Wiring •Defective Pump
F06	Temperature Sensor Interruption or Short Circuit	•Heater faulty
F07	Metering Pump (Fuel pump) Interruption or Short Circuit	•Open or Shorted Wiring
F08	Combustion Fan Motor Interruption, Short Circuit or Incorrect fan Speed	•Heater faulty
F09	Pencil Type Glow Plug/Flame Detector Interruption or Short Circuit	•Heater faulty
F10	Overheating Condition	•Coolant Flow Restriction •Circulation Pump

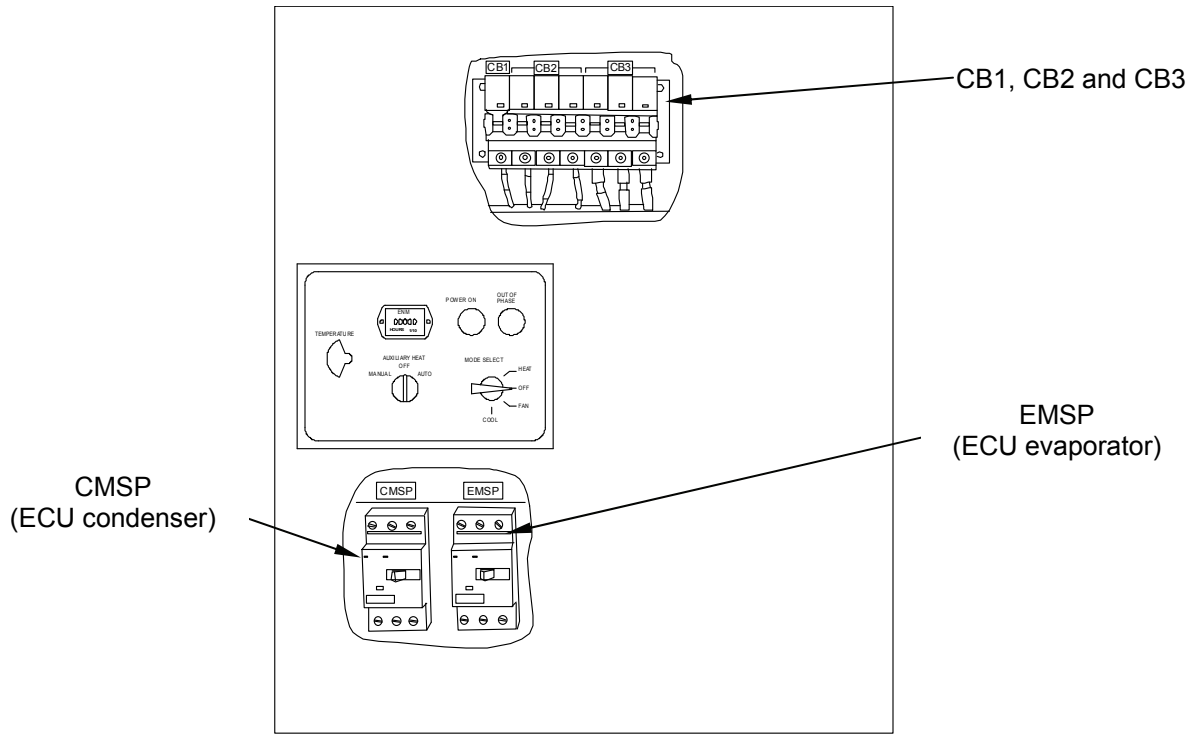

Figure 1. Circuit Breaker Location for TMSS-MED ECU (Version 1).

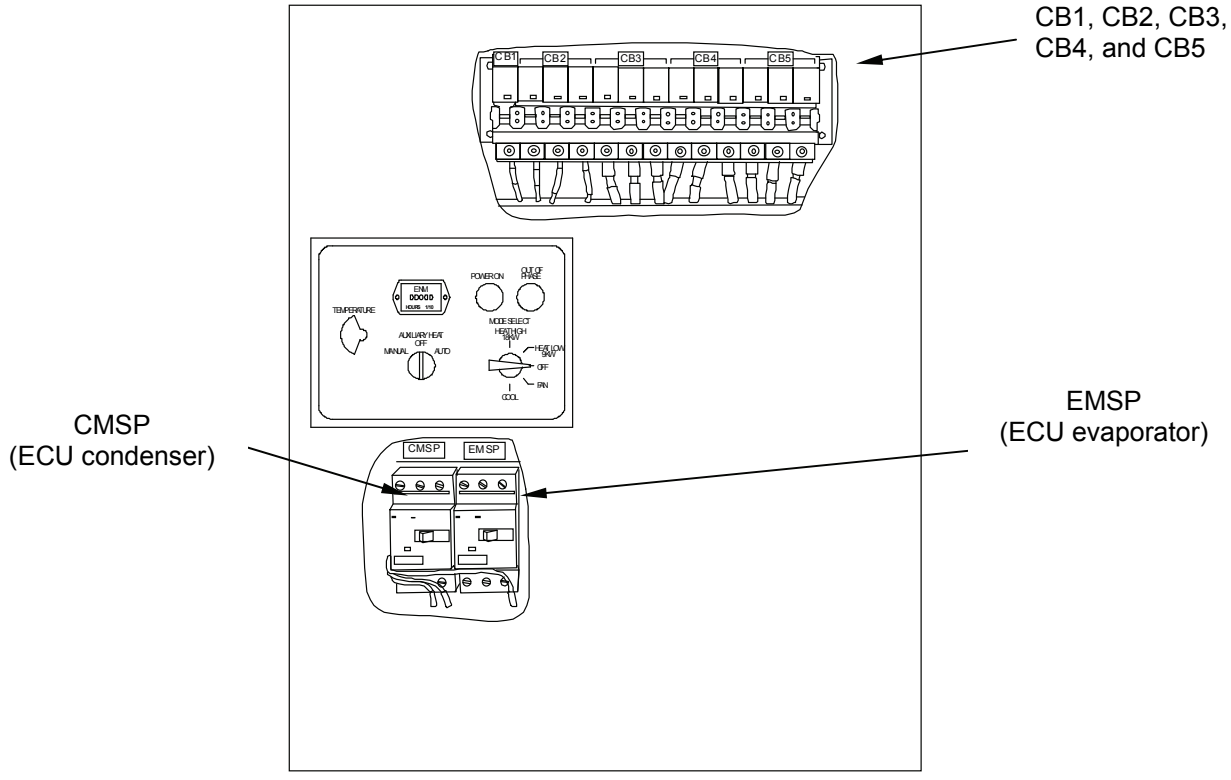

Figure 2. Circuit Breaker Location for TMSS-MED ECU (Version 2).

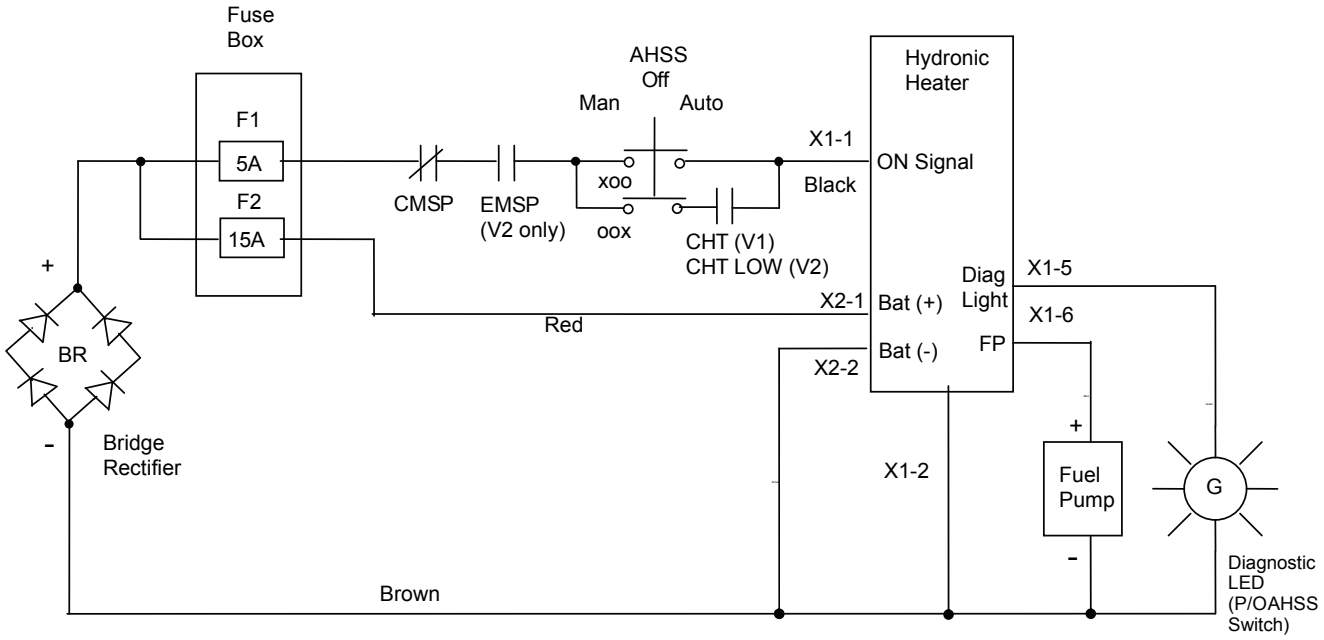

Figure 3. Hydronic (Auxiliary) Heater Circuit.

END OF TASK

MODE SELECT SWITCH – TEST

NOTE

There are two different versions of MODE SELECT switch. Version 1 allows for just HEAT selection. Version 2 allows for selection of HEAT HIGH (18 KW) and HEAT LOW (9 KW).

Refer to (Figures FO-1 and FO-2) for schematic and wiring diagram of Version 1 of the ECU.

Refer to (Figures FO-3 and FO-4) for schematic and wiring diagram of Version 2 of the ECU.

TEST

Version 1

Using a multimeter, make continuity measurement. See (Table 3).

Table 3. MODE SELECT (Version 1) Switch Test.

	FROM (Terminal #)	TO (Terminal #)	METER READING
Fan	11	12/14/15	2 Ω or less
Heat	21	22	2 Ω or less
Cool	21	25	2 Ω or less

Version 2

Using a multimeter, make continuity measurement. See (Table 4).

Table 4. MODE SELECT (Version 2) Switch Test.

	FROM (Terminal #)	TO (Terminal #)	METER READING
Fan	11	12/13/15/16	2 Ω or less
Heat (9 KW)	31	32	2 Ω or less
Heat (18 KW)	41	42/43	2 Ω or less
Cool	21	22	2 Ω or less

END OF TASK

THERMOSTAT– TEST

NOTE

Refer to (Figures FO-1 and FO-2) for schematic and wiring diagram of Version 1 of the ECU.

Refer to Figures (FO-3 and FO-4) for schematic and wiring diagram of Version 2 of the ECU.

TEST

Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

COOL MODE

1. Ensure that return duct baffle is closed.
2. Set thermostat to 100°F.
3. Set MODE SELECT switch on ECU Control Panel to COOL.
4. Listen for audible whistle from Hot Gas By-pass Valve.
5. Slowly turn thermostat temperature down.
6. Once thermostat falls below ambient temperature, the Hot Gas By-pass Valve should close and whistling will cease indicating a operational thermostat.
7. If thermostat does not pass test replace as described below.

END OF TASK

HEAT MODE

1. Ensure that return duct baffle is closed.
2. Set thermostat to 40°F.

NOTE

If heater contacts do not pull in verify that thermostat is bad by testing heater contactors.

3. Slowly raise thermostat temperature. When thermostat temperature reaches ambient temperature, observe heater contacts operating.

4 If thermostat does not pass test replace as described below.

END OF TASK

CIRCUIT BREAKERS– TEST

NOTE

Refer to (Figures FO-1 and FO-2) for schematic and wiring diagram of Version 1 of the ECU.

Refer to (Figures FO-3 and FO-4) for schematic and wiring diagram of Version 2 of the ECU.

TEST

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Open ECU control panel door.
3. Set multimeter to read resistance.

WARNING

Prior to performing the following test, ensure that all power to ECU has been disconnected. Failure to comply with this warning could result in electrical shock or death to the individual and/or damage to the equipment.

4. Place Circuit breaker in the OFF position.
5. Place meter probes across associated terminals of circuit breaker and measure resistance. Multimeter should read open (infinite). If a readable resistance is measured, circuit breaker is bad, replace.
6. Place Circuit breaker in the ON position.
7. Place meter probes across associated terminals of circuit breaker and measure resistance. Multimeter should read short (0 Ω). If any resistance is measured circuit breaker is bad, replace.

END OF TASK

COMPRESSOR CONTACTOR– TEST

NOTE

Refer to (Figures FO-1 and FO-2) for schematic and wiring diagram of Version 1 of the ECU.

Refer to (Figures FO-3 and FO-4) for schematic and wiring diagram of Version 2 of the ECU.

STATIC

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Open ECU control panel door.
3. Set multimeter to read resistance.
4. Place meter probes across associated terminals of contactor and activate contactor by pushing in on actuator. Multimeter should read a short (0 Ω). If any resistance is measured across contactor, contactor is bad, replace.

END OF TASK

ACTIVE

1. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.
2. Set MODE SELECT switch to COOL.
3. Set thermostat to 40°F.
4. Observe contactor pulling in. If contactor does not pull in, use multimeter to measure between wire # 45 and # 33H on contactor for 24 VAC.
5. If 24 VDC is present, replace contactor.

NOTE

Compressor is on a 24 second time delay.

6. If 24 VDC is not present, troubleshoot time delay.

END OF TASK

HEATER CONTACTOR– TEST

NOTE

Refer to (Figures FO-1 and FO-2) for schematic and wiring diagram of Version 1 of the ECU.

Refer to (Figures FO-3 and FO-4) for schematic and wiring diagram of Version 2 of the ECU.

TEST (STATIC)

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Open ECU control panel door.
3. Set multimeter to read resistance.
4. Place meter probes across associated terminals of contactor and activate contactor by pushing in on actuator. Multimeter should read a short (0 Ω). If any resistance is measured across contactor, contactor is bad, replace.

END OF TASK

TEST (ACTIVE)

1. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.
2. Set MODE SELECT switch as follows:
   - Version 1 – Set MODE SELECT switch to HEAT
   - Version 2 – Set MODE SELECT switch to HEAT HIGH 18 KW
3. Set thermostat to 100°F.
4. Observe contactors pulling in. If contactor does not pull in, using a multimeter, measure for 24 VAC. See (Table 5).

Table 5. Heater Contactor Measurements.

	FROM	TO	READING
Heater contactor (CHT) (V1)	40	33I	24 VAC
Heater contactor (CHT LOW) (V2)	40B	33I	24 VAC
Heater contactor (CHT HI) (V2)	40C	33K	24 VAC

5. If 24 VDC is present, replace contactor.
6. If 24 VDC is not present:
   - Version 1 – Troubleshoot thermostat.
   - Version 2 – Troubleshoot MODE SELECT switch and thermostat.

END OF TASK

TRANSFORMER– TEST

NOTE

Refer to (Figures FO-1 and FO-2) for schematic and wiring diagram of Version 1 of the ECU.

Refer to (Figures FO-3 and FO-4) for schematic and wiring diagram of Version 2 of the ECU.

TEST

1. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.
2. Using multimeter, measure across terminals H1 and H2 of transformer for 208 VAC.
3. If 208 VAC present, measure across terminals X1 and X2 of transformer for 24 VAC.
4. If 208 VAC not present, verify that all connections are correct and CB1 on Genset is energized.
5. If 24 VAC is not present at X1 and X2 of transformer, replace transformer.

END OF TASK

BRIDGE RECTIFIER– TEST

NOTE

Refer to (Figures FO-1 and FO-2) for schematic and wiring diagram of Version 1 of the ECU.

Refer to (Figures FO-3 and FO-4) for schematic and wiring diagram of Version 2 of the ECU.

TEST

1. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.
2. Place MODE SELECT switch into HEAT mode, and AUXILIARY HEAT switch into MANUAL and operate hydronic heater.
3. Using multimeter, measure across terminals 33 and 32A bridge rectifier for 24 VAC.
4. If 24 VAC not present, all connections are correct and check transformer for 24 VAC as described above.
5. If 24 VAC present, set multimeter to measure DC and measure across terminals 57 and 58 of bridge rectifier for 24 VDC.
6. If 24 VDC not present, at 57 and 58 of bridge rectifier, replace bridge rectifier.

END OF TASK

CMSP/EMSP– TEST

NOTE

The CMSP receives input signals from the thermostat (via wire # 41D) and the terminal board pin # TB-8. The EMSP receives input signals from the MODE SELECT switch (pin 15) (via wire # 37C) and the CMSP (via wire # 51). Verify that these connections are correct and that these components are operating properly.

Refer to (Figures FO-1 and FO-2) for schematic and wiring diagram of Version 1 of the ECU.

Refer to (Figures FO-3 and FO-4) for schematic and wiring diagram of Version 2 of the ECU.

TEST

1. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.
2. Verify that CMSP/EMSP are set to OFF.
3. Using multimeter, measure terminals listed in (Table 6) for 208 VAC.

Table 6. CMSP/EMSP Voltage Inputs.

Meter connections		Meter reading	CMSP 208 VAC Input Connections		EMSP 208 VAC Input Connections	
From	To		Terminal	Wire	Terminal	Wire
L1	L2	208 VAC	L1	12B	L1	12A
L2	L3	208 VAC	L2	13B	L2	13A
L3	L1	208 VAC	L3	14B	L3	14A

4. If 208 VAC not present, troubleshoot input power to ECU from Genset.
5. If 208 VAC present, energize CMSP/EMSP and measure across terminals listed in (Table 7) for 208 VAC.

Table 7. CMSP/EMSP Voltage Outputs.

Meter connections		Meter reading	CMSP 208 VAC Input Connections		EMSP 208 VAC Input Connections	
From	To		Terminal	Wire	Terminal	Wire
T1	T2	208 VAC	T1	18	T1	15
T2	T3	208 VAC	T2	19	T2	16
T3	T1	208 VAC	T3	20	T3	17

6. If 208 VAC not present, replace CMSP/EMSP.
7. Measure across terminals listed in (Table 8) for 28 VAC.

TEST – Continued

Table 8. CMSP/EMSP 28 VAC Outputs.

Terminal/ (Wire marker)		Meter reading
CMSP		
From	**To**	
21 (50B)	22 (51)	28 VAC
A1 (41D)	A2 (33F/33G)	28 VAC
EMSP		
13 (51)	14 (52A)	28 VAC
A1 (37C)	A2 (33G/33H)	28 VAC

8. If 28 VAC not present, replace CMSP/EMSP.

END OF TASK

END OF WORK PACKAGE

MAINTAINER TROUBLESHOOTING PROCEDURES
TMSS-MED
ECU (HEATING & COOLING)/HYDRONIC HEATER

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0162, Item 1)
Multimeter (WP 0162, Item 2)

References
WP 0005, WP 00030, WP 0092
WP 0095 - WP 0103, WP 0113

Personnel Required
Two

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the TMSS-MED by maintainer-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the TMSS-MED. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identity all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

There are two different circuit designs for the ECU control panel. Refer to (Figures 1 and 2 of WP 0030) for location and identification of circuit breakers. Refer to the fold-outs at the end of this TM for electrical and refrigeration schematics of the ECU.

Table 1. Maintainer Troubleshooting – ECU (Heating & Cooling).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	Conditioned air too warm (in Cool mode)	ECU Circuit breaker tripped	Disconnect power source from ECU (WP 0005). Open ECU control panel. Inspect circuit breaker(s) (Figures 1 or 2 of WP 0030). If tripped, reset and test system. If circuit breaker(s) (Figures 1 or 2 of WP 0030) trip again, contact next level of maintenance.
		Blower motor bad/inoperative	Fan belt damaged/out of adjustment. Shut down ECU and inspect blower motor and belt for operation. If necessary, adjust fan belt (WP 0098). If blower motor is still inoperative, contact next level of maintenance.
		Condenser fan bad/ inoperative	Shut down ECU and inspect condenser fan for operation. Remove any debris that may impede operation. If condenser fan is still inoperative, contact next level of maintenance.
		Evaporator coil dirty	Inspect evaporator coil. If necessary, clean.
		Condenser coil fins blocked with debris	Inspect condenser grill and coil. If necessary remove condenser grill and clean coils (WP 0092).
		High pressure switch tripped	Shut down ECU and check high pressure switch. If necessary, reset switch and attempt to restart ECU. If high pressure switch trips again, contact next level of maintenance. Contact next level of maintenance.

Table 1. Maintainer Troubleshooting – ECU (Heating & Cooling) - Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1 (cont.)	Conditioned air too warm (in Cool mode)	Thermostat or solenoid valve faulty	Set all circuit breakers OFF. Set DMM to VAC. Clip (or hold) DMM neutral lead to neutral wire at TB-2. Set circuit breakers CB2 and CB1 to ON. Set Mode Select Switch (MSS) to COOL. Set thermostat to coldest setting. If condenser fan is not working, proceed to electrical troubleshooting (WP 0030) for fan failure. Use DMM to measure between 22 to 26 VAC across solenoid valve at TB-1 and neutral TB-2. If not within tolerance, replace thermostat (WP 0103). If within tolerance and sight glass does not indicate low refrigerant replace solenoid valve (WP 0100).
		ECU circuit breaker, contactor, or motor protector tripping	Proceed to electrical troubleshooting (WP 0030).
		Refrigerant charge low.	Inspect sight glass for indication of low charge or contamination. Recharge/replace refrigerant (WP 0113).
		Blower motor bad	If mechanical damage replace blower or motor (WP 0096).
		Condenser fan bad	If mechanical damage replace fan or motor (WP 0097).
		Condenser coil	If coil shows signs of physical damage, refer to next level of maintenance.

Table 1. Maintainer Troubleshooting – ECU (Heating & Cooling) - Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1 (cont.)	Conditioned air too warm (in Cool mode)	Evaporator coil	If coil shows signs of physical damage, refer to next level of maintenance. Check evaporator coil overall temperature. If part of coil is relatively warm and evaporator inlet is sweaty or frosty, thermal expansion valve or distributor may be obstructed or damaged. If coil is iced and sight glass does not indicate low refrigerant, replace High Gas By-pass Valve (HGBV) (WP 0100).
		TEV/D bad/inoperative	Verify sensing bulb is correctly installed (WP 0100). If TEV/D frozen thaw with warm water and replace filter/dryer (WP 0102). If TEV/D is obstructed or damaged replace it (WP 0100).
		Clogged filter/dryer	If filter/dryer is cold to touch, frosted, sweating, or if discharge end colder then input replace it (WP 0102).
		Pressure switch fault or refrigerant charge incorrect.	Recover and recharge refrigerant (WP 0113). If condition reoccurs, replace switch (WP 0095).
2	Conditioned air too cold (in Heat mode)	Filters clogged/damaged	Inspect filter(s). If necessary, clean/replace (WP 0101).
		Blower motor bad/inoperative	Fan belt damaged/out of adjustment. Shut down ECU and inspect blower motor and belt for operation. If necessary, adjust fan belt (WP 0098). If blower motor is still inoperative, contact next level of maintenance. Contact next level of maintenance.

Table 1. Maintainer Troubleshooting – ECU (Heating & Cooling) - Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
3	Blower does not operate	Fan belt damaged/out of adjustment	Shut down ECU and inspect blower motor and belt for operation. If necessary, adjust/replace fan belt (WP 0098). If blower motor is still inoperative, contact next level of maintenance.
			Contact next level of maintenance.
4	Discharge pressure too high	Condenser fan inoperative	Inspect condenser fan for operation. If necessary, tighten belts (WP 0098). If fan(s) are still inoperative, contact next level of maintenance.
		Condenser coil fins blocked with debris	Inspect condenser grill and coil. If necessary, remove condenser grill and clean coils (WP 0092).
			Contact next level of maintenance.
5	Discharge pressure too low		Contact next level of maintenance.
6	Suction pressure too high	Condenser coil fins blocked with debris	Inspect condenser grill and coil. If necessary, remove condenser grill and clean coils (WP 0092).
		Voltage supplied to ECU incorrect (too high/too low)	Check meters on Genset control panel. If necessary, adjust VOLTAGE ADJUST potentiometer.
			Contact next level of maintenance.
7	Suction pressure too low		Contact next level of maintenance.
8	Compressor fails to start	Compressor overload open	Shut down ECU and allow compressor to reset.
			Contact next level of maintenance.
9	Compressor "short cycles"	Evaporator coil dirty	Inspect evaporator coil. If necessary, clean coils.
		Evaporator coil iced	Inspect evaporator coil. If iced up, shut system down and allow ice to melt.
10	Compressor noisy	Condenser fan inoperative	Inspect condenser fan for operation. If necessary, tighten belts (WP 0098). If fan(s) are still inoperative, contact next level of maintenance.

Table 1. Maintainer Troubleshooting – ECU (Heating & Cooling) - Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
10 (cont.)	Compressor noisy	Condenser coil fins blocked with debris	Inspect condenser grill and coil. If necessary, remove condenser grill and clean coils (WP 0092). Contact next level of maintenance.
11	Compressor starts normally but shuts down due to overload	TEV/D or HGBV	Perform Superheat Adjustment (WP 0100). If adjustment cannot be made replace the TEV/D, HGBV, and compressor in that order.
12	Compressor excessively noisy	TEV/D or Quench Valve (QV) faulty	If compressor makes knocking noise check suction line for low temperature indicating that refrigerant is returning to compressor. Perform Superheat Adjustment (WP 0100). If adjustment doesn't correct problem replace QV, TEV/D, or compressor in that order.
		Refrigerant overcharge	Recover and recharge refrigerant (WP 0113). If condition reoccurs, replace compressor (WP 0099).
		Compressor phase rotation wrong	Use schematic to verify wiring is correct for proper compressor rotation.
13	Conditioned air too cold (in Heat mode)	Electrical control circuit or heater element faulty	Proceed to ECU electrical troubleshooting (WP 0030).

END OF TASK

END OF WORK PACKAGE

MAINTAINER TROUBLESHOOTING PROCEDURES
TMSS-MED
TRAILER (ELECTRICAL) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Multimeter (WP 0165, Item 2)

References
WP 0124

Personnel Required
Two

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the TMSS-MED by maintainer-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the TMSS-MED. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

If trailer currently has incandescent tail lights and tail light and/or cable is damaged and must be replaced, entire incandescent system must be replaced with LED type tail light, and inter-vehicular cable.

Table 1. Maintainer Troubleshooting – Trailer (Electrical).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	Tail light intermittent	Loose electrical connection	Verify that connections (including ground) are properly connected. **NOTE** For incandescent bulb only.
		Bulb(s)	Inspect connection at bulb socket for corrosion. Clean and reconnect.
		Inter-vehicular cable intermittent	Inspect entire length of inter-vehicular cable for damage (i.e., cuts, gashes). If damage is present, replace inter-vehicular cable (WP 0124). Inspect connector pins/contacts for corrosion. Clean and reconnect. If necessary, measure continuity of Inter-vehicular cable. If DMM reads greater than 5Ω for any continuity reading, inter-vehicular cable is bad, replace (WP 0124). Contact next level of maintenance.
2	Tail light does not work	Tail light damaged	Inspect tail light assembly for damage. If damaged, replace (WP 0124).
		Loose electrical connection	Verify that connections (including ground) are properly connected. **NOTE** For incandescent bulb only.
		Bulb(s)	Replace bulb (WP 0124).

Table 1. Maintainer Troubleshooting – Trailer (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
2 (Cont)	Tail light does not work	Inter-vehicular cable inoperative	Measure continuity of Inter-vehicular cable. If DMM reads greater than 5Ω or for any continuity reading, inter-vehicular cable is bad, replace (WP 0124). Contact next level of maintenance.

END WORK PACKAGE

MAINTAINER TROUBLESHOOTING PROCEDURES
TMSS-MED
TRAILER (MECHANICAL) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
)

Personnel Required
Two

References
WP 0022, WP 0119, WP 0121
WP 0126 thru WP 0129

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the TMSS-MED by maintainer-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the TMSS-MED. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identity all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Table 1. Maintainer Troubleshooting – Trailer (Mechanical).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	Hand brake does not engage	Damage to hand brake handle/cable	Inspect hand brake handle/cable for damage.
		Hand brake out of adjustment	Adjust hand brake (WP 0128).
		Hand brake cable seized or damaged	Replace damaged hand brake cable (WP 0128).
		Hand brake assembly bent or damaged	Replace damaged hand brake handle/cable (WP 0128).
2	Hand brake does not disengage	Hand brake cable seized or damaged	Replace damaged hand brake cable (WP 0128).
		Hand brake assembly bent or damaged	Replace damaged hand brake handle/cable (WP 0128).
		Parking brake link in wheel assembly bent or damaged	Replace damaged parking break link (WP 0126).
3	Brake fluid present under trailer	Loose connection	Tighten connection.
		Brake lines kinked or damaged	Replace damaged brake line(s) (WP 0127).
		Damage to master cylinder or brake lines	Inspect master cylinder/brake lines for leaks or loose connections. Replace damaged master cylinder (WP 0127).
		Damage to wheel cylinder	Replace wheel cylinder (WP 0126).
4	Brake actuator does not engage	Damage to brake actuator	Inspect brake actuator for damage. Contact next level of maintenance.
5	Hydraulic brakes exhibit failure	Loose connection	Tighten connection.
		Brake line(s) kinked or damaged	Replace damaged brake line(s) (WP 0127).
		Damage to brake actuator	Replace damaged brake actuator (WP 0128).
		Damage to master cylinder	Replace damaged master cylinder (WP 0127).
		Damage to brakes and/or components.	Replace brakes or brake component (WP 0126).

Table 1. Maintainer Troubleshooting – Trailer (Mechanical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
5 (cont.)	Hydraulic brakes exhibit failure	Lock out pin installed in actuator	Remove pin.
6	Trailer does not track straight when towed or leans to side	Lockout pin in place in actuator	Remove pin.
		Master cylinder fluid low or empty	Add fluid to master cylinder (WP 0022).
		Tire(s) not rotating evenly	Check tire(s) for proper inflation (20 psi – highway; 17 psi off road). Add/remove air as necessary.
		Tire(s) damaged	Inspect tire(s) for uneven/ excessive wear. Replace tire (WP 0129).
		One of the hand brakes engaged	Release hand brake.
		Trailer frame or suspension damaged.	Inspect frame/suspension. If damage present contact next level maintenance.
7	Tire(s) will not hold air pressure	Tire unserviceable	Replace tire (WP 0129).
8	Tongue jack assembly will not raise/lower	Tongue jack assembly damaged	Inspect all movable joints and areas for damage. If damaged, replace tongue jack assembly (WP 0119).
9	Trailer stabilizer leg does not raise/lower	Stabilizer leg damaged	Inspect stabilizer leg for damage. If damaged, replace stabilizer leg (WP 0121).
10	Excessive motion of lunette	Shock absorber damaged	Replace shock absorber (WP 0128).

END OF WORK PACKAGE

MAINTAINER TROUBLESHOOTING PROCEDURES
TMSS-MED
SHELTER (ELECTRICAL) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Multimeter (WP 0165, Item 2)

References
WP 0130

Personnel Required
One

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the TMSS-MED by maintainer-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the TMSS-MED. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Table 1. Maintainer Troubleshooting – Shelter (Electrical).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	Shelter lighting does not come on	Check light bulb	Verify that bulb is good. If necessary replace (WP 0130).
		Check fuse	Verify that fuse is good. If necessary replace (WP 0130).
		PDU malfunctioning	Verify that PDU is properly connected and is operating properly. If necessary, troubleshoot PDU (see below).
		Bad cable(s)	Replace cable. If necessary, verify by using multimeter to measure continuity of cable.
		Lighting fixture	Replace lighting fixture.
2	No power from PDU	Check power from source to PDU	Verify that source (i.e., Genset) is operating properly. • Circuit breakers have not tripped. • Sufficient fuel. • Meters on Genset control panel are giving proper indications. • Cable from source to PDU is not damaged. If necessary measure voltage at end of source cable (208 VAC, 3Ø, 60 HZ). Verify that PDU is operating properly by measuringL • 208 VAC, 3Ø, 60 HZ at J2. • 120 VAC at J3 through J8 of PDU. Verify that 120 VAC cable(s) are connected properly and that no damage is present. If possible replace output cable with "known good" cable.
3	Power indicator lights inoperable	PDU	Replace PDU.

END OF WORK PACKAGE

CHAPTER 6

MAINTAINER MAINTENANCE INSTRUCTIONS FOR TMSS-MED GENSET

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
SERVICE UPON RECEIPT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0162, Item 1)

Personnel Required
Two to four

References
WP 0005, WP 0019, WP 0037, WP 0039 – WP 0086

GENERAL

The following procedures are required to be performed by Maintainer level maintenance in order to prepare the TMSS-MED for use.

SITING

For minimal problems with set-up and operation of TMSS-MED and equipment being used insure area is:

- Dry.
- Level with adequate room for trailer, shelter, system grounding, and all other associated equipment.
- Free of items (trees, buildings, or other structures) that would impede set-up of TMSS-MED or cause physical interference for trailer, shelter, system grounding, and all other associated equipment.
- Free of items (e.g., towers, power lines, radar, trees, buildings) that would cause interference with electronic equipment being used inside of shelter.

SHELTER/TRAILER REQUIREMENTS

The TMSS-MED shelter requires a footprint of 23 feet (7.01 meters) by 32 feet (9.75 meters). In addition, the TMSS-MED trailer requires a foot print of 16 feet (4.85 meters) by 7 feet (2.16 meters) for set-up and installation.

SERVICE UPON RECEIPT

Inspect system components for damage incurred during shipment. If any damage is visible, notify supervisor. Report the damage on DD Form 361, Transportation Discrepancy Report. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with applicable service instructions.

Once all covers are removed, inspect the trailer, shelter, and each piece of equipment for damage incurred during shipment. Inspect all loose pieces of equipment located in the trailer cargo box.

INSTALLATION INSTRUCTIONS

The TMSS-MED requires some assembly depending on the mode of operation. To setup the TMSS-MED in a fixed mode of operation, refer to Operation Under Usual Conditions (WP 0005) for setup and power-up procedures.

PRELIMINARY SERVICING OF EQUIPMENT

WARNING

When working on the TMSS-MED, do not operate electric equipment if floors, ceiling or walls of the individual enclosure show evidence of water intrusion. Electrical shock can cause personnel injury or death.

Do not apply power if grounding is not connected. Electrical shock can cause personnel injury or death.

The TMSS-MED trailer carries an expandable shelter. Care must be taken in the removal and replacement of this equipment from the trailer to avoid damage. Maintainer PMCS for the TMSS-MED is in (WP 0037). For Maintainer level removal and replacement procedures of components and assemblies refer to (WP 0039 through WP 0086).

Once the TMSS-MED has been placed into service, the following maintenance should be performed after the first 50 hours of operation.

- Change oil & filter
- Check tension on all belts
- Check coolant level

PRELIMINARY CHECK AND ADJUSTMENTS OF EQUIPMENT

Before placing the equipment into service, ensure that all Crew PMCS (WP 0019) and Maintainer PMCS (WP 0037) have been performed.

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
PMCS INTRODUCTION – GENSET

GENERAL

This work package provides data necessary to keep the TMSS-MED operational ready. PMCS are performed to keep the TMSS-MED Genset in operational condition. The checks are used to find, correct, and report problems. Maintenance personnel are required to perform the tasks as indicated in Maintainer PMCS (WP 0037, Table 1). PMCS are performed by the Maintainer each time the equipment is operated. Prior to performing any maintenance that requires climbing on or under TMSS-MED Genset, ensure cage bolts are not inserted and wheels are chocked. Injury to personnel could result from TMSS-MED Genset suddenly rolling or tipping.

Before you begin operating the TMSS-MED Genset, do Before PMCS.

Once a week do Weekly PMCS. If TMSS-MED Genset has not been operated in a week, perform Before PMCS.

Do Monthly PMCS once a month. If TMSS-MED Genset has not been operated in a month, perform PMCS as outlined in (WP 0037).

If you are operating the TMSS-MED Genset for the first time, perform Weekly PMCS the first time you do your Before PMCS.

If you find something wrong when performing PMCS, fix it if you can. Otherwise, notify your supervisor.

WARNINGS AND CAUTIONS

Special attention should be paid to the WARNINGS and CAUTIONS appearing in the Maintainer PMCS table. A WARNING means someone could be injured. A CAUTION means equipment could be damaged.

LEAKAGE DEFINITION

It is necessary for you to know how fluid leakage affects the status of the trailer. The following are definitions of the classes of leakage you need to know to be able to determine the status of the trailer. Learn these leakage definitions when in doubt, contact next level of maintenance.

CAUTION

Maintainers must perform appropriate maintenance when Operators report Class III leaks. Failure to comply may result in damage to equipment.

NOTE

The following not applies to non-flammable liquids only. Any leakage of flammable liquid is unacceptable.

Equipment operation is allowable with minor leakages (Class I or II). Consideration must be given to fluid capacity of the item or system being checked. When in doubt, notify your supervisor.

When operating with Class I or II leaks, continue to check fluid levels as required in your PMCS.

LEAKAGE DEFINITION – Continued

CLASS I - Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

CLASS II - Leakage of fluid great enough to form drops but not enough to cause drops to drip from item. being checked.

CLASS III - Leakage of fluid great enough to form drops that fall from the item being checked.

INSPECTION

Look for signs of a problem or trouble. Senses help here. You can feel, smell, hear, or see many problems. Be alert when on the TMSS-MED Genset.

Inspect to see if items are in good condition. Are they correctly assembled, stowed, and secured, or excessively worn, leaking, corroded, or improperly lubricated? Correct any problems found or notify your supervisor.

There are some common items to check all over the TMSS-MED Genset. These include the following:

1. Bolts, clamps, nuts, and screws: Continuously check for looseness. Look for chipped paint, rust, or corrosion around bolt and screw heads and nuts. Tighten them when you find them loose. If tools are not available, notify your supervisor.

2. Welds: Many items on the TMSS-MED Genset are welded. To check these welds, look for chipped paint, rust corrosion, or gaps. When these conditions exist, Maintainer must notify their supervisor.

3. Electrical wires, connectors, and harnesses: Tighten loose connectors. Look for cracked or broken insulation, bare wires, and broken connectors. If any damage is found, Maintainer must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify next their supervisor.

4. Hoses and fluid lines: Look for wear, damage and leaks, and make sure clamps and fittings are tight. Wet spots mean a leak. A stain by a fitting or connector can also mean a leak. If any leaks or damage is found, Maintainer must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify their supervisor.

5. Belts and pulleys: Check belt tension. Look for cracks, excessive wear and damage. Check pulleys for rust corrosion, or damage. If any damage is found, Maintainer Level Maintenance must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify their supervisor.

LUBRICATION MAINTAINER INTERVALS - NORMAL CONDITIONS

General

For safer, more trouble-free operations, make sure that your TMSS-MED Genset is serviced when it needs it. Proper lubrication and maintenance intervals which are the responsibility of the Maintainer level maintenance are found in this work package.

Adherence

Intervals (on-condition or hard time) and the related man-hour times are based on normal operation. The man-hour time specified is the time needed to do all the maintenance prescribed for a particular interval. On-condition (OC) oil sample intervals shall be applied. Change the hard time interval if lubricants are contaminated or if operating the equipment under adverse operating conditions, included longer-than-usual operating hours. The calendar interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard time intervals must be applied during the warranty period.

Cleaning Fittings Before Lubrication

WARNING

Cleaning solvents may be toxic and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breath vapors. Keep away from heat or flame. Never smoke when using cleaning solvent. Failure to comply may result in serious injury or death to personnel.

If personnel become dizzy while using cleaning solvents, immediately get fresh air and medical help. If cleaning solvent contacts skin or clothes, flush with cold water. If cleaning solvent contacts eyes, immediately flush eyes with water and get medical attention. Failure to comply may result in serious injury or death to personnel.

Clean parts with cleaning solvent. Dry before lubricating.

Lubrication After Fording

If a fording operation occurs, lubricate all fittings below fording depth and check submerged gear boxes for presence of water.

Lubrication After High Pressure Washing

After a thorough washing, lubricate all grease fittings and oil can points outside and underneath trailer.

Corrosion Control

Refer to Corrosion Prevention and Control (CPC), (WP 0001), for appropriate corrosion control procedures.

Hard Time Lubrication Intervals

For equipment under manufacturer's warranty, hard time lubrication intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (e.g. longer than usual operating hours, extended idling periods, extreme dust).

EXPLANATION OF TABLE ENTRIES

Item Number - Numbers in this column are for reference. When completing DA Form 2404/DA Form 5988E (Equipment Inspection and Maintenance Worksheet), include the item number for the check/service indicating a fault. Item numbers appear in the order in which the checks/services are performed for the interval listed.

Interval - This column indicates when a procedure must be performed (i.e., Before, During, or After an operation.)

Item to Be Checked or Serviced - This column provides the item that is to be checked or serviced.

Procedure - This column describes the procedure that must be followed to ensure that the equipment is capable of performing its intended mission.

Equipment Not Ready/Available If - This column lists conditions that make the TMSS-MED not fully mission capable. If the problem can be fixed using the troubleshooting procedures and/or maintenance procedures in this manual, do so. If not, document the items not able to be fixed on DA Form 2404 for the next level of maintenance. For further information on how to use this form, see DA PAM 750-8. Be sure to observe and annotate all special circumstances that appear/occur.

EXPLANATION OF TABLE ENTRIES - Continued

Other Entries - Be sure to observe and annotate all special circumstances that appear/occur.

NOTE

If the equipment must be kept in continuous operation, only perform those procedures that will not disturb operation. Complete checks and services when the equipment is shut down.

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
PMCS (GENSET)

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0162, Item 1)

References
WP 0039 – WP 0086

Personnel Required
Two

Table 1. Maintainer Preventive Maintenance Checks and Services – Genset.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
		GENSET		
1	Weekly		**NOTE** Refer to (WP 0039 through WP 0086) for Genset maintenance procedures. **WARNING** Ensure radiator is fully cooled. Hot coolant could erupt into operator's face and cause severe injury.	
			1. Check radiator associated hoses and clamps for any type of damage or deterioration. Ensure that hoses are not collapsed, swollen, excessively soft, or spongy. Ensure that no damage or corrosion is present to associated clamps. Replace hoses and clamps as necessary.	Damage to radiator and associated hoses (to include cuts, tears, holes, and leaks) or associated clamps present.
			2. Check water pump for cracks, leaks, or other damage. Replace if necessary.	Electrical connections are not correct. Battery fuse bad. Damage to battery, cables, terminals, or warmer present.

Table 1. Maintainer Preventive Maintenance Checks and Services – Genset – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1 (cont.)			3. Check battery, cables, battery fuse, and warmer. Ensure that all are securely fastened. Ensure that no physical damage, (i.e., cracks) is present to battery, cables, associated terminals, battery fuse, and warmer. Ensure that electrical connections are correct. Ensure that all are clean and free of excessive dirt, grease, and grime. Replace battery, cables, battery fuse, or warmer as necessary.	Electrical connections are not correct. Battery fuse bad. Damage to battery, cables, terminals, or warmer present.
			4. Check muffler, spark arrestor, and exhaust pipes for excessive corrosion, dents, dings, holes, leaks. Replace as necessary.	Physical damage or excessive corrosion present. Parts missing.
			5. Check Genset Control Panel fuses.	Fuse blown.
	First 50 Hours		Change oil and filter.	
	50 Hours		1. Check fluid levels. Verify that fluids (i.e., oils, coolants) are at their proper levels, no discoloration or indication of burning/overheating is present.	Low fluid, discolored fluids.
			2. Check all belts and associated pulleys. Belts should not show any signs of excessive wear, cracking or other damage. Check belts for proper tension. Pulleys should not contain any deformities or other signs of physical damage. Replace/adjust belts as necessary.	Damage or excessive wear to belts and associated pulleys present. Belt tension not adjusted properly.
	125 Hours		1. Check fuel filter. If excessively dirty or discolored, change.	Fuel filter excessively dirty or discolored.
			2. Check and clean air filter. If beyond cleaning, replace. If operating in a hot climate, change air filter.	Air filter excessively dirty.

Table 1. Maintainer Preventive Maintenance Checks and Services – Genset – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1 (cont.)	250 Hours		Check tightness of CB terminal screws. Torque to 45 in-lbs.	Cannot tighten or terminal screw damaged.
	250 Hours		1. Change oil and filter.	Oil and filter has not been changed.
			2. Clean air filter.	
	500 Hours		1. Perform overall inspection of TMSS-MED. Check all components for damage. Check for completeness.	Missing/incomplete hardware causing improper operation of system.
			2. Perform 250 hour PMCS.	
			3. Change fuel and air filter.	
	1,000 Hours		1. Check all external fittings for leaks and completeness.	Fittings leak or inoperative.
			2. Perform 500 hour PMCS.	
	2,000 Hours		1. De-carbonize engine. If performing poorly, contact next level of maintenance.	Engine does not operate efficiently.
			2. Replace filters and fan belt.	
			3. Change engine coolant.	
			4. Drain and clean fuel tank.	Fuel contaminated.

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET MAINTENANCE INDEX

GENERAL

This section contains an index of repair/removal/replacement or maintenance procedures that may be needed during maintenance or repair of the TMSS-MED Genset by Maintainer personnel. Maintenance is limited to those failures that may be repaired at the Maintainer level. The index identifies the maintenance function, which is followed by a column that identifies the work package and page(s) where Maintainer level procedure(s) may be found. The index is provided to assist in the quick location of a procedure. The manual cannot list all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

	Maintenance Function	Procedure
GENSET – DIESEL ENGINE		
1.	Access panels removal/replacement	0039-2
2.	Access panels latch removal/replacement	0039-10
3.	Access cover removal/replacement	0039-12
4.	Genset – control panel latches removal/replacement	0040-2
5.	Fuse test/removal/replacement	0040-4
6.	Battery fuse removal/replacement (version 1)	0041-2
7.	Battery fuse removal/replacement (version 2 and 3)	0041-5
8.	Battery, retainer, and mounting bracket removal/replacement (version 1)	0041-8
9.	Battery, retainer, and mounting bracket removal/replacement (version 2)	0041-13
10.	Battery, retainer, and mounting bracket removal/replacement (version 3)	0041-19
11.	Battery warmer removal/replacement (version 1)	0041-25
12.	Battery warmer removal/replacement (version 2 and 3)	0041-28
13.	Oil and oil filter removal/replacement	0042-2
14.	Air intake filter removal/replacement	0043-2
15.	Fuel filter removal/inspect/replacement	0044-2
16.	Fuel tank service	0045-2
17.	Low oil pressure cut-off switch removal/replacement	0046-2
18.	Electric fuel pump removal/replacement	0047-2
17.	Fuel injector removal/clean/replacement	0048-2
19.	Fuel injector pump removal/replacement	0048-6
20.	Fuel injection system lines removal/replacement	0048-10
21.	Prime fuel system	0048-16
22.	Glow plug and connector strip removal/inspect/test/replacement	0049-2
23.	Oil pressure switch removal/replacement	0050-2
24.	Oil pressure sending unit removal/replacement	0051-2
25.	K2 or K3 solenoid removal/replacement	0052-2
26.	K4 solenoid removal/replacement	0052-5
27.	K4 solenoid circuit breaker removal/replacement	0052-8
28.	Starter removal/replacement	0053-2
29.	Diesel speed sensor removal/inspect/test/replacement	0054-2
30.	Coolant temperature sensor removal/replacement	0055-2
31.	Coolant temperature switch removal/replacement	0056-2
32.	Thermostat removal/replacement	0057-2
33.	Engine coolant removal/replacement	0058-2
34.	Engine coolant reservoir bottle removal/replacement	0058-5
35.	Radiator, hoses and clamps removal/replacement	0059-2
36.	Alternator removal/replacement	0060-2
37.	Fan belt inspection/adjustment/removal/replacement	0061-2
38.	Fan removal/replacement	0062-2

Maintenance Function		Procedure
GENSET – DIESEL ENGINE – Continued		
39.	Water pump removal/replacement	0063-2
40.	Engine heater (hydronic) removal/replacement	0064-2
41.	Engine heater (hydronic) fuel pump and fuel filter removal/replacement	0064-6
42.	Engine heater (hydronic) hose removal/replacement	0064-11
43.	Engine heater (hydronic) fuse removal/replacement	0064-19
44.	Exhaust flex pipe, elbow and muffler removal/replacement	0065-2
45.	Exhaust manifold and gasket removal/replacement	0066-2
GENSET – CONTROL PANEL		
46.	Torque specifications	0067
47.	AC meters adjustment/removal/replacement	0068-2
48.	Gauges and meters test/removal/replacement	0069-2
49.	Hour meter test/removal/replacement	0069-7
50.	Voltage adjust potentiometer test/removal/replacement	0070-2
51.	Rotary switches removal/replacement	0070-5
52.	Toggle switches removal/replacement	0070-9
53.	Panel lights removal/replacement	0071-2
54.	Indicator lights removal/replacement	0071-4
55.	Battery switch removal/replacement	0072-2
56.	Emergency stop switch removal/replacement	0072-5
57.	Control panel wiring harness removal/replacement	0073-2
GENSET – POWER DISTRIBUTION PANEL		
58.	Power distribution panel lights removal/replacement (old version)	0074-2
59.	Power distribution panel lights removal/replacement (new version)	0074-5
60.	Connector (J1 & J4) removal/replacement	0074-8
61.	Connector (J2 & J3) removal/replacement	0074-12
62.	Connector (J5) removal/replacement	0074-16
63.	Connector (J6) removal/replacement	0074-20
GENSET – BARRIER PANEL		
64.	Current transformer removal/replacement	0075-2
65.	Transducer removal/replacement	0076-2
66.	Relay (K4, K5, K6, K7) removal/replacement	0077-2
67.	Time delay removal/replacement	0078-2
68.	Voltage regulator removal/replacement/adjustment	0079-2
69.	Speed sensor removal/replacement	0080-2
70.	Precision governor removal/replacement/adjustment	0081-2
71.	Circuit breaker removal/replacement	0082-2
72.	Battery charger test/removal/replacement	0083-2
GENSET – FUEL		
73.	Fuel selector switch removal/replacement	0084-2
74.	Auxiliary fuel ports removal/replacement	0084-5
75.	Fuel gauge removal/inspect/replacement	0085-2
76.	Fuel tank removal/replacement	0085-5
77.	Fuel hose removal/replacement	0085-10
78.	Fuel line heater removal/replacement	0085-12
ENGINE/GENERATOR		
79.	Genset (including enclosure) – removal and replacement	0086-2
80.	Engine generator assembly – removal/replacement	0086-7
81.	Separating engine generator assembly – removal and replacement	0086-26

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET ACCESS PANELS AND LATCHES

GENERAL

This work package provides information on the removal and replacement of the Genset access panels, access panel latches, and access covers. They consist of:

- Side access panels removal/replacement
- Power distribution panel (PDP) access panel removal/replacement
- Control panel access panel removal/replacement
- Top access panel removal/replacement
- Access panel latch removal/replacement
- Access cover removal/replacement

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

ACCESS PANELS REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Latch

Personnel Required
One

References
WP 0005

Equipment Condition
Genset shut down

SIDE ACCESS PANELS

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. If applicable, remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Lift up latch (Figure 1, Item 3) on access panel (Figure 1, Item 2).
4. Turn latch (Figure 1, Item 3) counter clockwise to open.
5. Repeat steps 3 and 4 for other latch.
6. Remove access panel (Figure 1, Item 2) from generator (Figure 1, Item 1).

END OF TASK

REPLACEMENT

1. Install access panel (Figure 1, Item 2) onto generator (Figure 1, Item 1).
2. Turn latch (Figure 1, Item 3) clockwise to lock.
3. Press down latch (Figure 1, Item 3) on access panel (Figure 1, Item 2).
4. Repeat steps 2 and 3 for other latch.
5. If applicable, install cargo restraints (not shown) to rear of Genset.
6. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

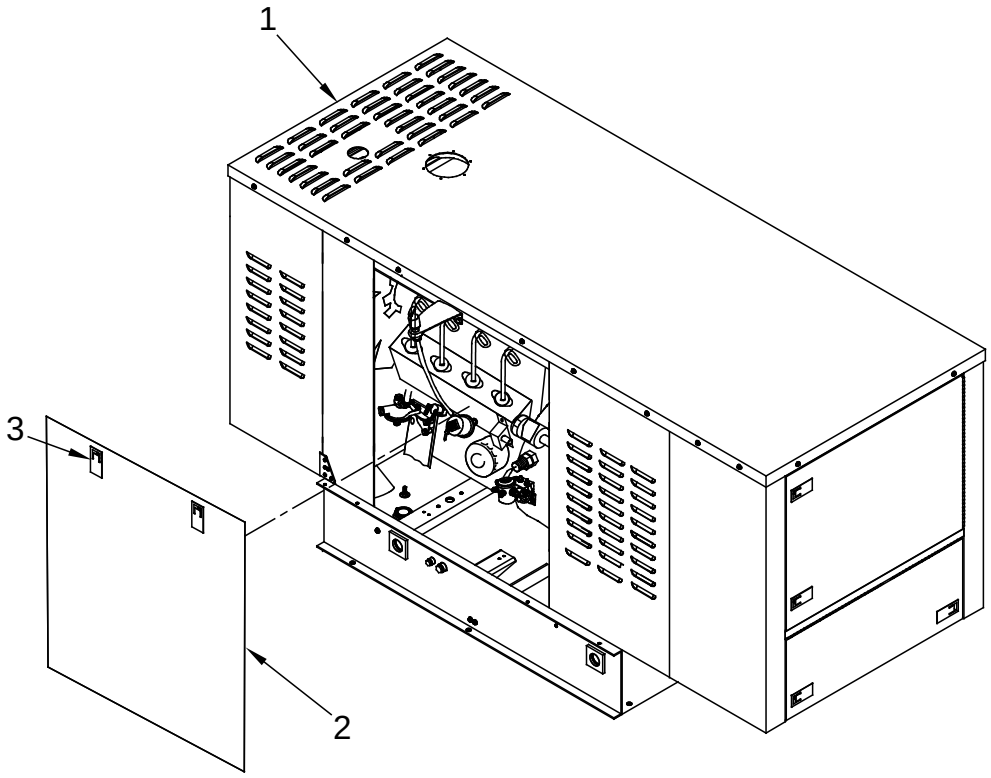

Figure 1. Side Access Panels Removal/Replacement.

END OF TASK

POWER DISTRIBUTION PANEL (PDP) ACCESS PANEL

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. If applicable, remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Lift up latch (Figure 2, Item 3) on PDP access panel (Figure 2, Item 2).
4. Turn latch (Figure 2, Item 3) counter clockwise to open.
5. Repeat steps 3 and 4 for other latch and open PDP access panel (Figure 2, Item 2).
6. Remove screw (Figure 2, Item 5) and self-locking nut (Figure 2, Item 4) that secures locking stay (Figure 2, Item 9) to PDP access panel (Figure 2, Item 2). Repeat for locking stay.
7. Remove thirteen screws (Figure 2, Item 6) that secure the PDP access panel (Figure 2, Item 2) to the generator (Figure 2, Item 1) via hinge.
8. Remove PDP access panel (Figure 2, Item 2).
9. Remove two screws (Figure 2, Item 7) and self-locking nuts (Figure 2, Item 8) that secure locking stay (Figure 2, Item 9) to generator (Figure 2, Item 1). Repeat for other locking stay.
10. Remove locking stays (Figure 2, Item 9) from generator (Figure 2, Item 1). If damaged, discard.

END OF TASK

REPLACEMENT

1. Install locking stays (Figure 2, Item 9) to generator (Figure 2, Item 1) and secure with screws (Figure 2, Item 7) and self-locking nuts (Figure 2, Item 8).
2. Install PDP access panel (Figure 2, Item 2) to generator (Figure 2, Item 1) and secure with thirteen screws (Figure 2, Item 6) via hinge.
3. Install locking stays (Figure 2, Item 9) to PDP access panel (Figure 2, Item 2) and secure with screws (Figure 2, Item 5) and self-locking nuts (Figure 2, Item 4).
4. Close PDP access panel (Figure 2, Item 2).
5. Turn latch (Figure 2, Item 3) on PDP access panel (Figure 2, Item 2) clockwise to lock.
6. Press down on the latch to secure.
7. Repeat steps 5 and 6 for other latch.
8. If applicable, install cargo restraints (not shown) to rear of Genset.
9. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

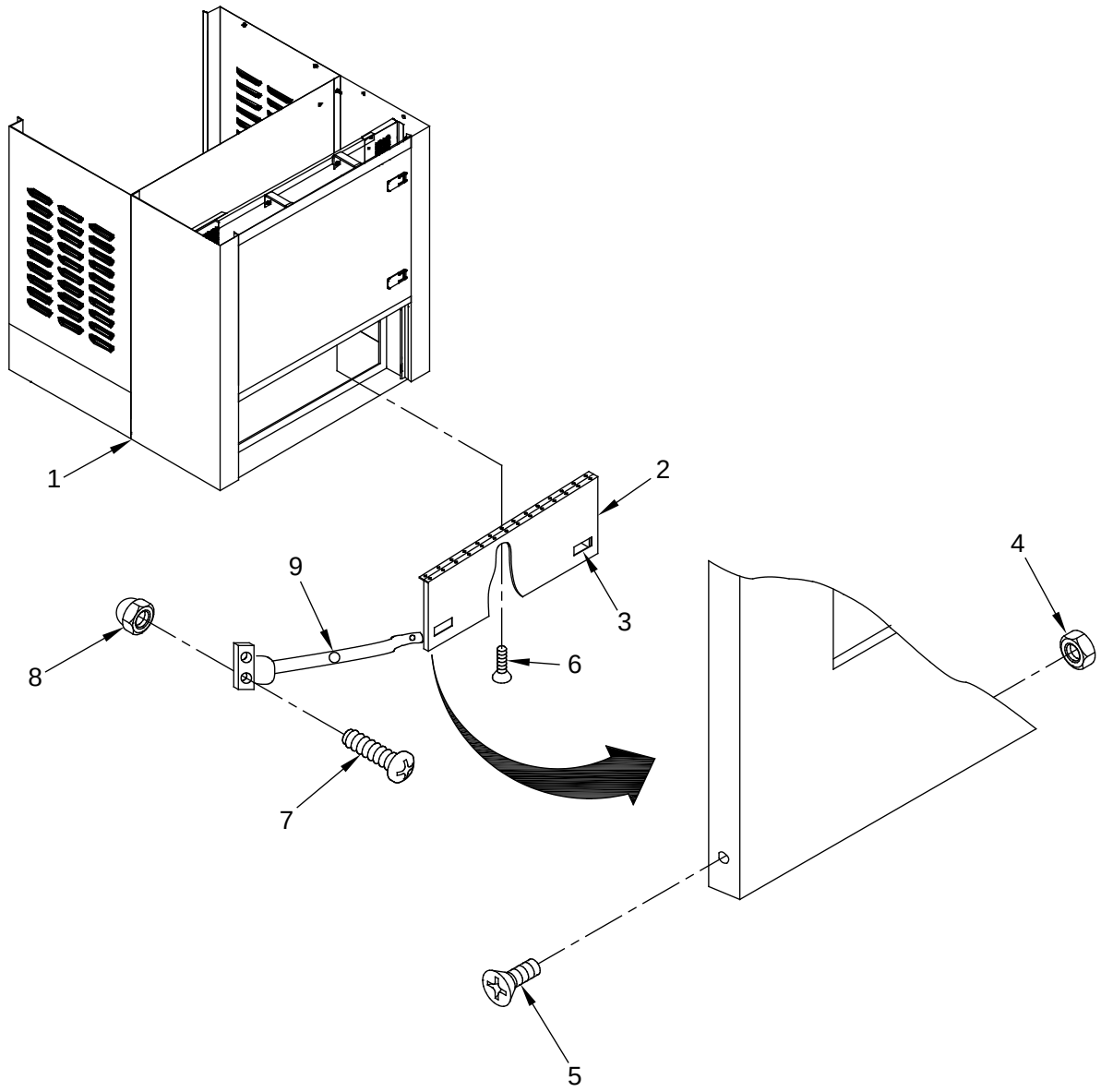

Figure 2. Power Distribution Panel (PDP) Access Panel Removal/Replacement.

END OF TASK

CONTROL PANEL ACCESS PANEL

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. If applicable, remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Lift up latch (Figure 3, Item 3) on control panel access panel (Figure 3, Item 4).
4. Turn latch (Figure 3, Item 3) counter clockwise to open.
5. Repeat steps 3 and 4 for other latch and open control panel access panel (Figure 3, Item 4).
6. Remove ten screws (Figure 3, Item 2) that secure control panel access panel (Figure 3, Item 4) to generator (Figure 3, Item 1) via hinge.
7. Remove control panel access panel (Figure 3, Item 4).

END OF TASK

REPLACEMENT

1. Install control panel access panel (Figure 3, Item 4) to generator (Figure 3, Item 1) and secure with ten screws (Figure 3, Item 2).
2. Close control panel access panel (Figure 3, Item 4).
3. Turn latch (Figure 3, Item 3) clockwise to lock.
4. Press down on latch (Figure 3, Item 3) to secure.
5. Repeat steps 3 and 4 for other latch.
6. If applicable, install cargo restraints (not shown) to rear of Genset.
7. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

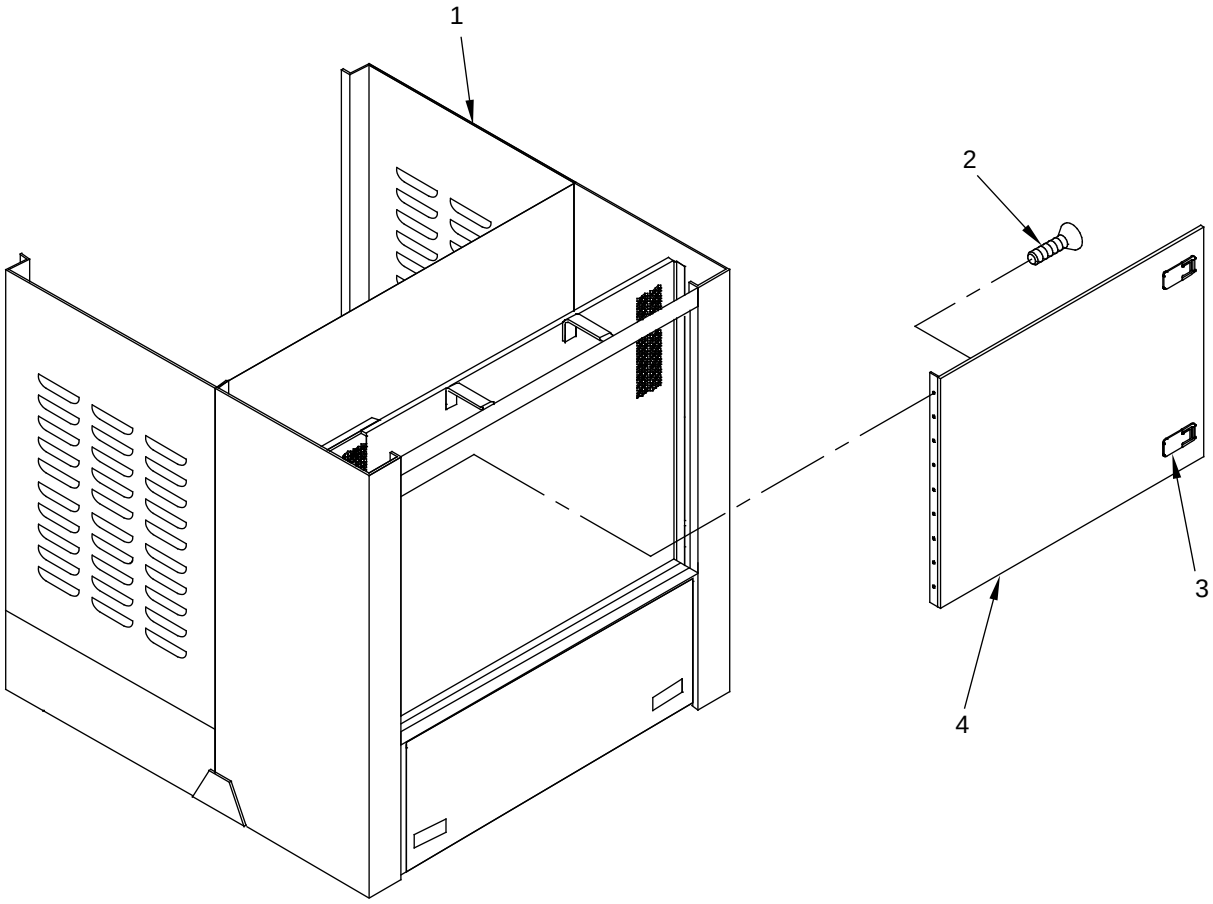

Figure 3. Control Panel Access Panel Removal/Replacement.

END OF TASK

TOP ACCESS PANEL

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).

2. If applicable, remove cargo restraints (not shown) to gain access to rear access panel of Genset.

3. Remove screw (Figure 4, Item 3) and nut (Figure 4, Item 1) that secure exhaust pipe cap (Figure 4, Item 2) to exhaust pipe (Figure 4, Item 4).

4. Remove exhaust pipe cap (Figure 4, Item 2).

5. Around the perimeter of the generator, remove twenty screws (Figure 4, Item 7), flat washers (Figure 4, Item 8), and lock washers (Figure 4, Item 9) that secure the top access panel (Figure 4, Item 5) to the generator (Figure 4, Item 6).

6. Carefully lift and remove top access panel (Figure 4, Item 5) from generator (Figure 4, Item 6).

END OF TASK

REPLACEMENT

1. Carefully set the top panel access cover (Figure 4, Item 5) on top of the generator (Figure 4, Item 6).

2. Secure top access panel (Figure 4, Item 5) to generator (Figure 4, Item 6) with twenty screws (Figure 4, Item 7), flat washers (Figure 4, Item 8), and lock washers (Figure 4, Item 9).

3. Install exhaust pipe cap (Figure 4, Item 2) onto exhaust pipe (Figure 4, Item 4).

4. Secure exhaust pipe cap (Figure 4, Item 2) to the exhaust pipe (Figure 4, Item 4) with screw (Figure 4, Item 3) and nut (Figure 4, Item 1).

5. If applicable, install cargo restraints (not shown) to rear of Genset.

6. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

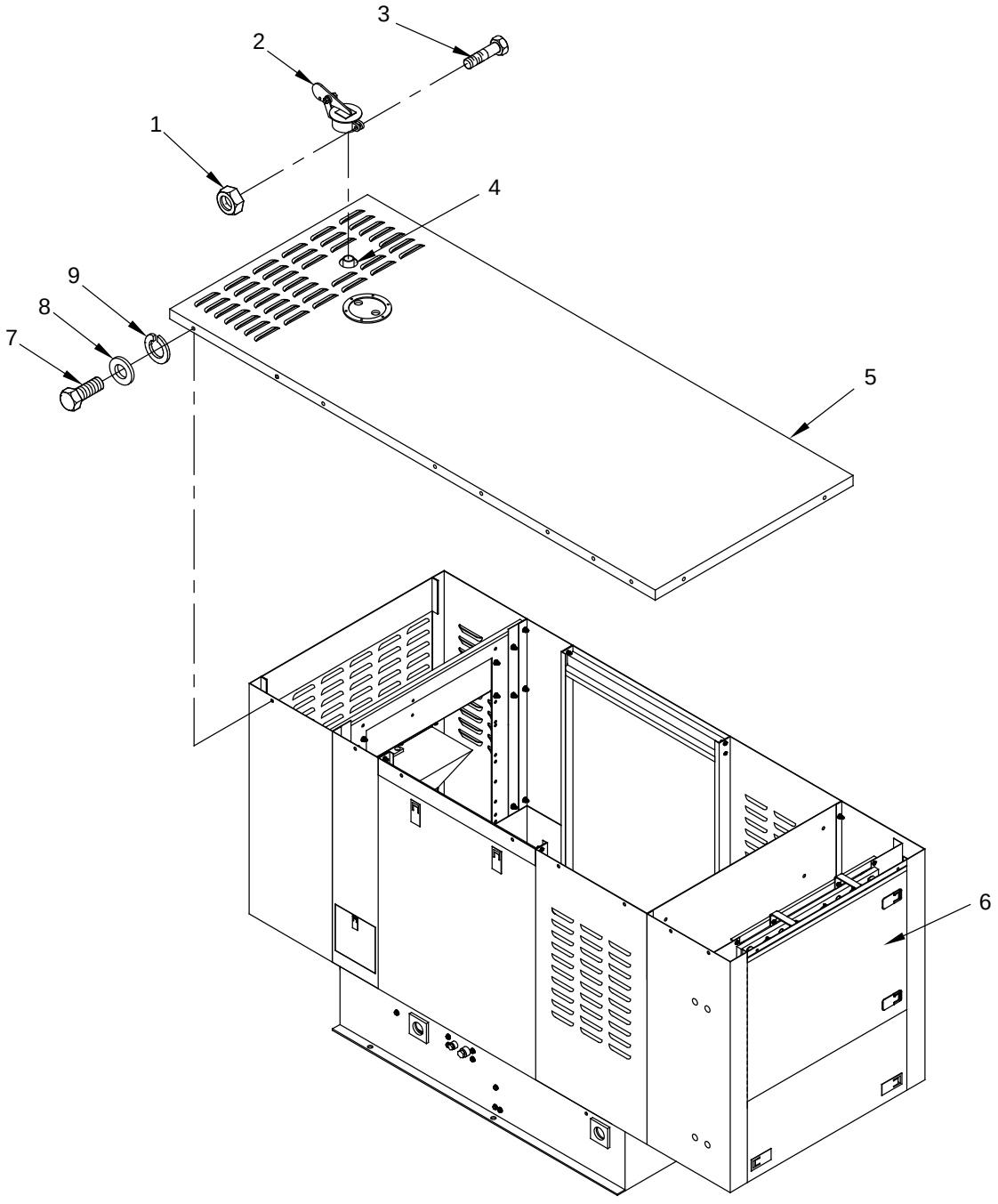

Figure 4. Top Access Panel Removal/Replacement.

END OF TASK

ACCESS PANEL LATCH REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Latch

Personnel Required
One

References
WP 0005

Equipment Condition
Genset shut down

NOTE

The following procedure is typical for all latches on the Genset and its access panels.

When attempting to perform the following step, if panel will not become unlatched, DO NOT force the access panel. If necessary, attempt to gain access to the damaged panel through the Genset. If this is necessary, make sure Genset is not in an operational status.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. If applicable, remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the Genset access panel (Figure 5, Item 4) with the broken latch.
4. Remove and retain screw (Figure 5, Item 6) and back plate (Figure 5, Item 5) from rear of the latch (Figure 5, Item 1).
5. Remove latch (Figure 5, Item 1) from access panel (Figure 5, Item 4).

END OF TASK

REPLACEMENT

1. Insert new latch (Figure 5, Item 1) into access panel (Figure 5, Item 4).
2. Secure latch (Figure 5, Item 1) to access panel (Figure 5, Item 4) using screw (Figure 5, Item 6) and back plate (Figure 5, Item 5).

NOTE

The following step does not apply to all latch assemblies.

3. If necessary, adjust screw (Figure 5, Item 2) and stop nut (Figure 5, Item 3) to proper level so latch (Figure 5, Item 1) operates properly.

REPLACEMENT – Continued

4. Reattach the repaired Genset access panel (Figure 1, Item 4).
5. If applicable, install cargo restraints (not shown) to rear of Genset.
6. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

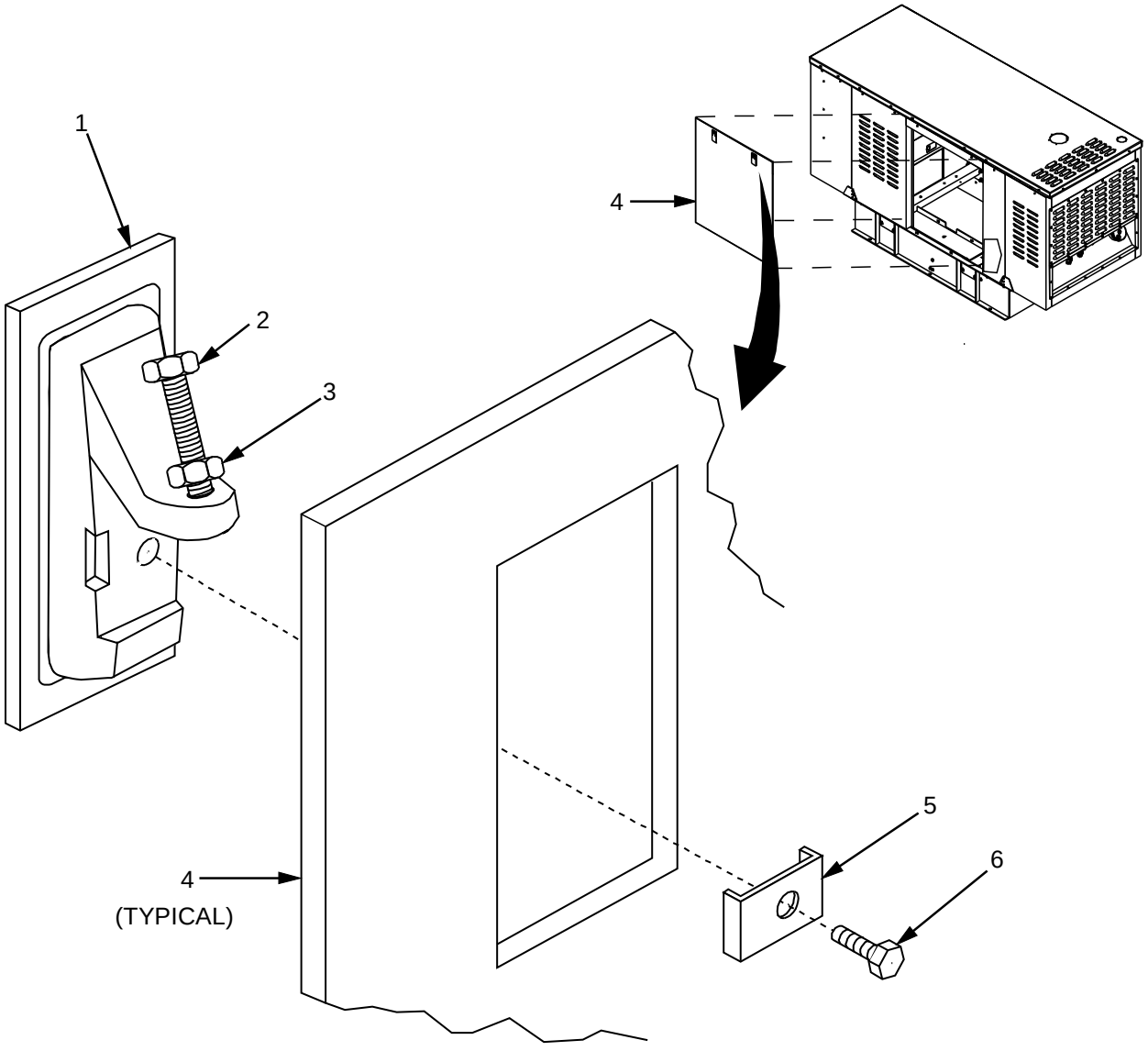

Figure 5. Genset Access Panel Latches Removal/Replacement.

END OF TASK

ACCESS COVER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Latch

Personnel Required
One

References
WP 0005

Equipment Condition
Genset shut down

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. If applicable, remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove tapping screw (Figure 6, Item 2) that secures access cover (Figure 6, Item 3) to access cover mounting bracket (Figure 6, Item 4) via attached string.
4. Remove access cover with attached string (Figure 6, Item 3). Discard if damaged.
5. Remove the remaining five tapping screws (Figure 6, Item 2) that secure the access cover mounting bracket (Figure 6, Item 4) to the generator (Figure 6, Item 1).
6. Remove access cover mounting bracket (Figure 6, Item 4). Discard if damaged.

END OF TASK

REPLACEMENT

1. Install access cover mounting bracket (Figure 6, Item 4) onto generator (Figure 6, Item 1). Make sure that the screw holes of the access cover mounting bracket (Figure 6, Item 4) align properly with the mounting holes on the generator (Figure 6, Item 1).
2. Secure access cover mounting bracket (Figure 6, Item 4) to generator (Figure 6, Item 1) with five tapping screws (Figure 6, Item 2).
3. Install access cover (Figure 6, Item 3) onto access cover mounting bracket (Figure 6, Item 4) via attached string. Secure using remaining tapping screw (Figure 6, Item 2).
4. If applicable, install cargo restraints (not shown) to rear of Genset.
5. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

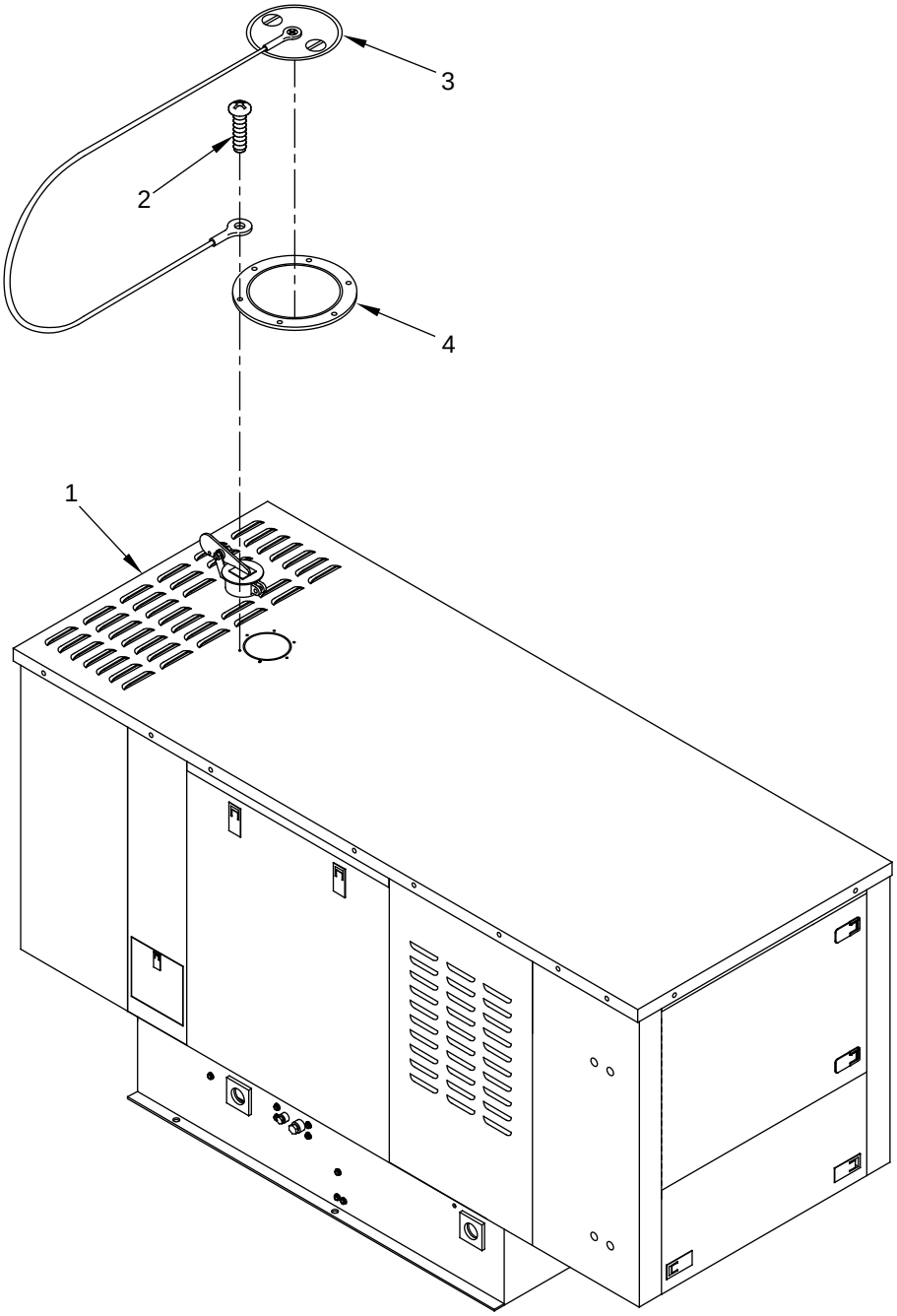

Figure 6. Access Cover Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET CONTROL PANEL LATCH AND FUSE

GENERAL

This work package provides information on the service and removal/replacement of sub assemblies for the Genset. They consist of:

- Control panel latches removal/replacement
- Fuse removal/replacement

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

GENSET – CONTROL PANEL LATCHES REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

Materials/Parts
Latches

Personnel Required
One

Reference
WP 0005, WP 0041

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset is in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Undo control panel latches and open.
3. Remove lock nut (Figure 1, Item 8), spacer (Figure 1, Item 7), latch (Figure 1, Item 6), lock washer (Figure 1, Item 5), nut (Figure 1, Item 4), retainer nut (Figure 1, Item 3), flat washer (Figure 1, Item 2), and latch handle (Figure 1, Item 9) from control panel (Figure 1, Item 1) and discard.

END OF TASK

REPLACEMENT

1. Insert new latch handle (Figure 1, Item 9) into opening in control panel (Figure 1, Item 1).
2. Secure latch handle (Figure 1, Item 9) with flat washer (Figure 1, Item 2) and retainer nut (Figure 1, Item 3). Tighten retainer nut (Figure 1, Item 3).
3. Attach nut (Figure 1, Item 4), lock washer (Figure 1, Item 5), latch (Figure 1, Item 6), spacer (Figure 1, Item 7), and lock nut (Figure 1, Item 8). Tighten assembly.
4. Close control panel (Figure 1, Item 1).
5. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

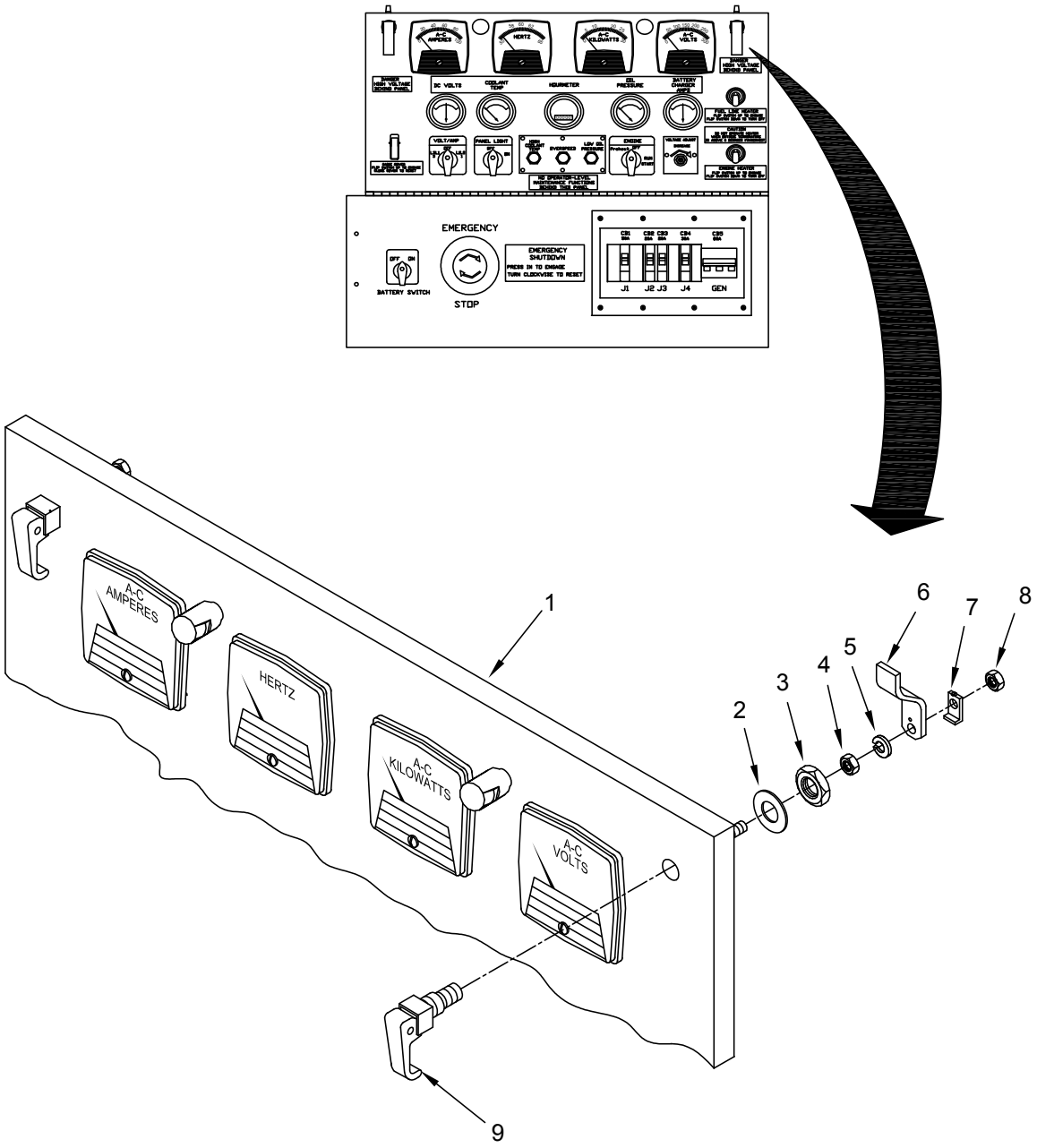

Figure 1. Control Panel Latch Removal/Replacement.

END OF TASK

FUSE TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:

Materials/Parts
Fuse

References
WP 0005

Personnel Required
One

Equipment Condition
Genset shut down

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

TEST

1. Set BATTERY switch to ON.
2. Set engine START switch to RUN.
3. Open control panel (Figure 2, Item 3) and observe LEDs (Figure 2, Item 2). If LED is on, fuse is bad, replace.

END OF TASK

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Open control panel (Figure 2, Item 3).
3. Remove retainer (Figure 2, Item 4) from inside of control panel cavity.
4. Open cover (Figure 2, Item 6) and remove fuse (Figure 2, Item 5).

END OF TASK

REPLACEMENT

1. Install new fuse (Figure 2, Item 5) and snap cover (Figure 2, Item 6) into place.
2. Insert retainer (Figure 2, Item 4) into empty slot in control panel cavity.
3. Close control panel (Figure 2, Item 3) and secure.
4. Start Genset as outlined in Genset Start Procedure (WP 0005) of this TM.

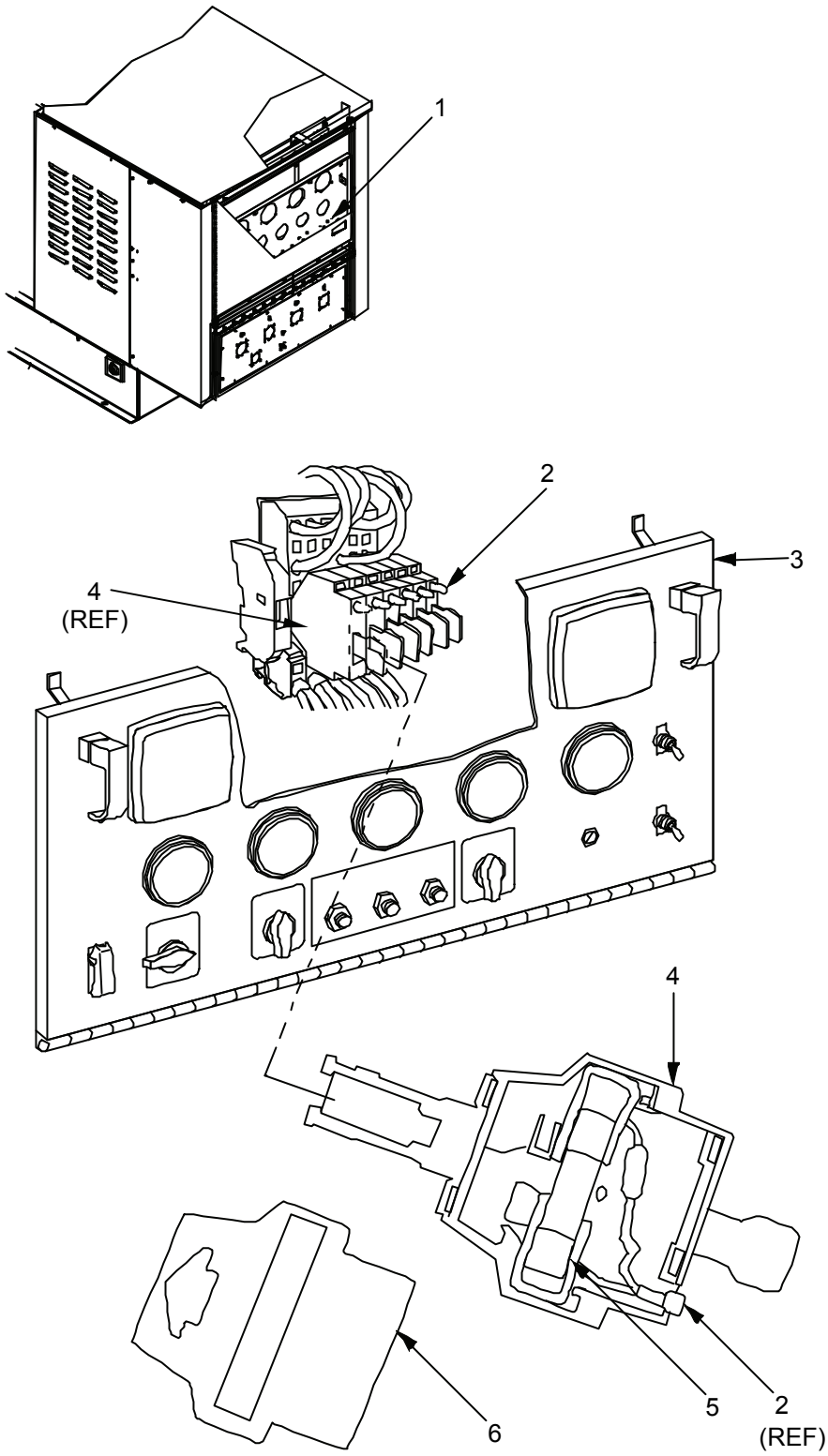

Figure 2. Fuse Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET BATTERY, BATTERY FUSE, SUPPORT BRACKET, AND WARMER

GENERAL

This work package provides information on the service and removal/replacement of sub assemblies for the Genset battery components. They consist of:

- Battery fuse removal/replacement
- Battery, retainer and bracket removal/replacement
- Battery warmer removal/replacement

There are three versions of the battery assembly. Refer to appropriate version. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

BATTERY FUSE REMOVAL/REPLACEMENT (VERSION 1)

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

Materials/Parts
Fuse, battery

Personnel Required
One

References
WP 0005

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

NOTE

The following Removal/Replacement procedure for the battery fuse is for Version 1. For Version 2 or Version 3, refer to appropriate procedure located in this WP.

BATTERY FUSE (VERSION 1)

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 1, Item 1) of Genset (Figure 1, Item 2).
3. Remove rear access panel (Figure 1, Item 1) from Genset (Figure 1, Item 2) and set aside.
4. Remove and retain nut (Figure 1, Item 6) that secures black cable (Figure 1, Item 7) to negative (-) terminal of battery (Figure 1, Item 8). (ALWAYS DISCONNECT GROUND WHEN CONDUCTING ANY PROCEDURES ON TRAILER).

REMOVAL – Continued

5. Loosen but do not remove both nuts (Figure 1, Items 3 and 5) that secure the ends of the battery fuse (Figure 1, Item 4) to the battery terminals (Figure 1, Item 9).

6. Rotate the battery fuse (Figure 1, Item 4) up away from the right battery terminal and lift away from left battery terminal.

7. Remove and discard battery fuse (Figure 1, Item 4).

END OF TASK

REPLACEMENT

1. Slide straight slotted end of battery fuse (Figure 1, Item 4) onto left battery terminal (Figure 1, Item 9). Rotate the battery fuse (Figure 1, Item 4) down so that the right angle slot slides around the bolt of the right battery.

2. Secure the ends of battery fuse (Figure 1, Item 4) to battery terminals (Figure 1, Item 9) with nuts (Figure 1, Items 3 and 5).

3. Install black cable (Figure 1, Item 7) to negative (-) terminal of battery (Figure 1, Item 8) and secure with nut (Figure 1, Item 6).

4. Install and secure rear access panel (Figure 1, Item 1).

5. Install cargo restraints (not shown).

6. Start Genset (Figure 1, Item 2) in accordance with Genset Start Procedure (WP 0005) of this TM.

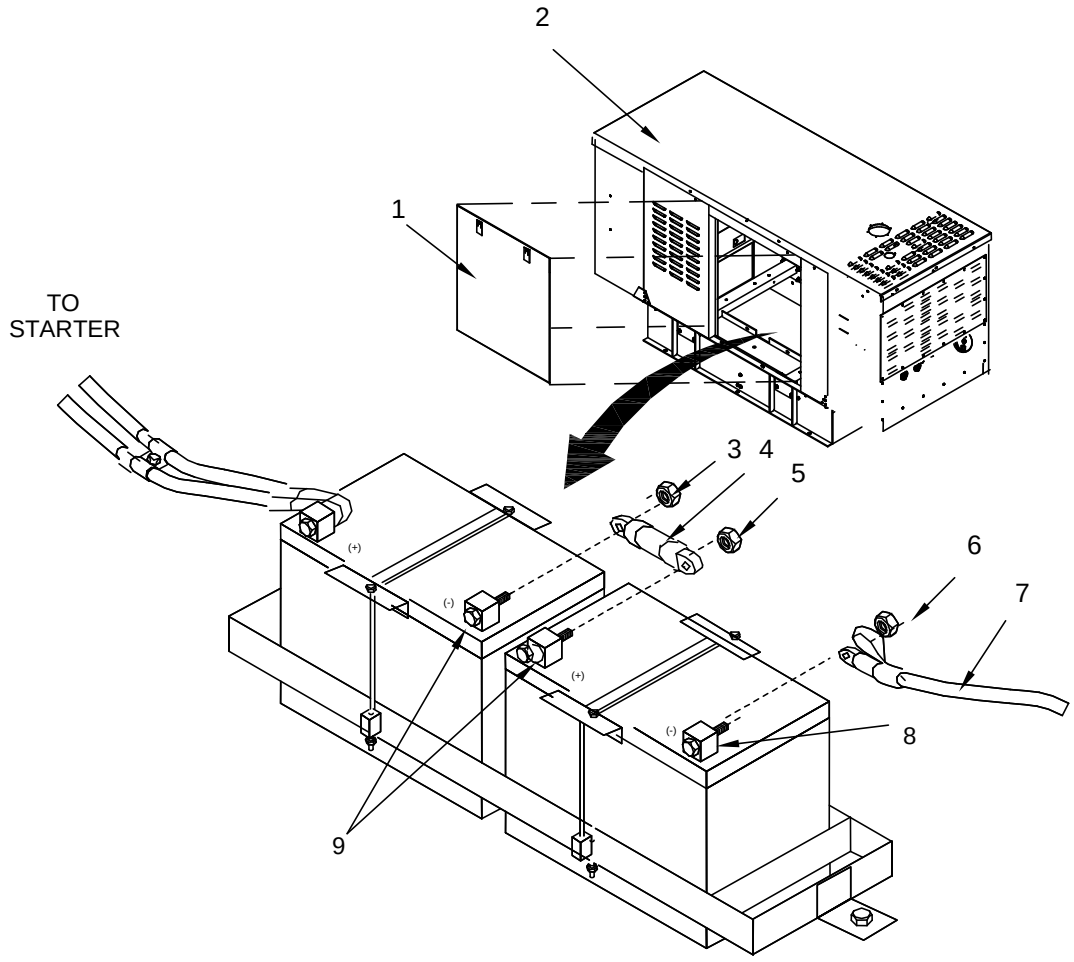

Figure 1. Battery Fuse Removal/Replacement (Version 1).

END OF TASK

BATTERY FUSE, FUSE HOLDER, AND CABLES REMOVAL/REPLACEMENT (VERSION 2 AND 3)

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

Materials/Parts
Fuse, battery

Personnel Required
One

References
WP 0005

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

NOTE

The battery fuse for Version 2 and Version 3 are removed and replaced in the same manner. For Version 1, refer to appropriate procedure earlier in this WP.

FUSE (VERSION 2 AND 3)

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove access door (Figure 1, Item 1) from Genset (Figure 1, Item 2) and set aside.
3. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in this WP). (ALWAYS DISCONNECT GROUND WHEN CONDUCTING ANY PROCEDURES ON TRAILER).
4. Remove and retain two nuts (Figure 2, Item 5), lock washers (Figure 2, Item 4), and flat washers (Figure 2, Item 3) that secure the fuse (Figure 2, Item 2) to the fuse holder (Figure 2, Item 8).
5. Remove and discard fuse (Figure 2, Item 2).

END OF TASK

REPLACEMENT

NOTE

Ensure that battery cables (Figure 2, Item 1) are installed onto fuse holder (Figure 2, Item 8).

1. Install new battery fuse (Figure 2, Item 2) onto fuse holder (Figure 2, Item 8).
2. Secure using two nuts (Figure 2, Item 5), lock washers (Figure 2, Item 4), and flat washers (Figure 2, Item 3).
3. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in this WP).
4. Install and secure access door (Figure 1, Item 1) on Genset (Figure 1, Item 2).
5. Start Genset (Figure 1, Item 2) in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

CABLE AND FUSE HOLDER

REMOVAL

1. Verify that Genset (Figure 1, Item 2) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove access door (Figure 1, Item 1) of Genset (Figure 1, Item 2) and set aside.
3. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in this WP). (ALWAYS DISCONNECT GROUND WHEN CONDUCTING ANY PROCEDURES ON TRAILER).
4. Remove insulator covers (Figure 2, Item 6) to allow access to hardware.
5. Remove and retain two nuts (Figure 2, Item 5), lock washers (Figure 2, Item 4), four flat washers (Figure 2, Item 3), and one fuse (Figure 2, Item 2) that secure short battery cables (Figure 2, Item 1) to battery terminals (Figure 2, Item 9) via fuse holder (Figure 2, Item 8).
6. Disconnect battery cable leads (Figure 2, Item 7) from positive and negative terminals (Figure 2, Item 10).
7. Remove battery cables (Figure 2, Item 1) from battery terminals (Figure 2, Item 9).
8. Remove fuse holder (Figure 2, Item 8). Discard if damaged.

END OF TASK

REPLACEMENT

1. Slide two insulator covers (Figure 2, Item 6) onto end of battery cables (Figure 2, Item 1) to be installed onto fuse holder (Figure 2, Item 8).
2. Position fuse holder (Figure 2, Item 8), fuse (Figure 2, Item 2), and two battery cables (Figure 2, Item 1) onto battery terminals (Figure 2, Item 9). Secure using two nuts (Figure 2, Item 5), lock washers (Figure 2, Item 4), and four flat washers (Figure 2, Item 3).
3. Connect battery cables leads (Figure 2, Item 7) to positive and negative terminals (Figure 2, Item 10).
4. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in this WP).

REPLACEMENT – Continued

5. Install and secure access door (Figure 1, Item 1) on Genset (Figure 1, Item 2).

6. Start Genset (Figure 1, Item 2) in accordance with Genset Start Procedure (WP 0005) of this TM.

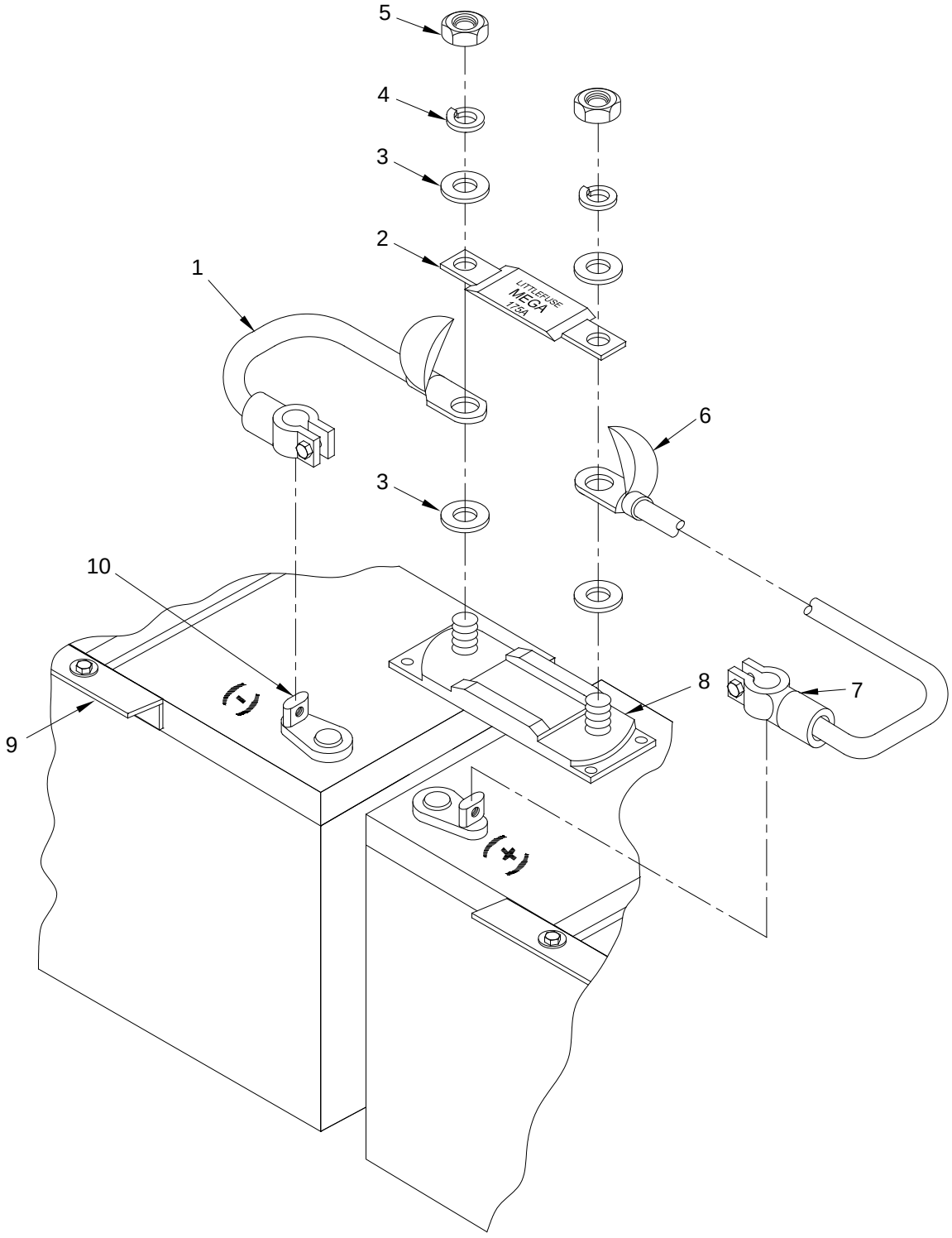

Figure 2. Battery Fuse (Version 2 and 3) and Associated Cables Removal/Replacement.

END OF TASK

BATTERY, RETAINER, AND MOUNTING BRACKET REMOVAL/REPLACEMENT (VERSION 1)

INITIAL SETUP:

Tools and Special Tools
General mechanic's toolkit (WP 0165, Item 1)

Materials/Parts
Battery
Battery mounting bracket
Battery retainer

Personnel Required
One

References
WP 0005

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High DC voltage, (24 VDC) (12 VDC per battery), and amperage present at electrical connections. Do not enter Genset when operational. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Never lay tools in or around battery area. Metal tools could cause batteries to short and cause damage to batteries, electrical parts of engine, or injury to personnel.

In event of a battery venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with acid resistant rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

NOTE

The following Removal/Replacement procedures for the battery, retainer, and mounting bracket are for Version 1. For Version 2 or Version 3, refer to appropriate procedure located in this WP.

RETAINER (VERSION 1)

REMOVAL

1. Verify that Genset (Figure 3, Item 4) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove rear access panel (Figure 3, Item 3) of Genset (Figure 3, Item 4) and set aside.
4. Loosen two nuts (Figure 3, Item 10) and remove battery fuse (Figure 3, Item 9).
5. Remove battery retainers (Figure 3, Item 6) from batteries (Figure 3, Items 13 and 20) by removing two nuts (Figure 3, Item 18) and flat washers (Figure 3, Item 19) from battery bolts (Figure 3, Item 1).

REMOVAL – Continued

NOTE

Cable clamp (Figure 3, Item 5) is present at one spot only.

6. Remove and retain cable clamp (Figure 3, Item 5). Lift retainer (Figure 3, Item 6), two bolts (Figure 3, Item 1), and flat washers (Figure 3, Item 2) off of battery (Figure 3, Items 13 and 20).

END OF TASK

REPLACEMENT

1. Place battery retainers (Figure 3, Item 6) onto batteries (Figure 3, Items 13 and 20), aligning holes in retainer (Figure 3, Item 6) with holes on mounting bracket (Figure 3, Item 17).

2. Insert two bolts (Figure 3, Item 1) and flat washers (Figure 3, Item 2). Install cable clamp (Figure 3, Item 5). Secure using two nuts (Figure 3, Item 18) and flat washers (Figure 3, Item 19).

3. To ensure equal pressure, alternately tighten bolts (Figure 3, Item 1) until battery retainer (Figure 3, Item 6) is secure.

4. Install battery fuse (Figure 3, Item 9). See Replacement procedure in this WP.

5. Install and secure access door (Figure 3, Item 3).

6. Install cargo restraints (not shown).

7. Start Genset (Figure 3, Item 4) in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

BATTERY (VERSION 1)

REMOVAL

WARNING

High DC voltage, (24 VDC) (12 VDC per battery), and amperage present at electrical connections. Do not enter Genset when operational. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

Depleted batteries should be turned in to designated personnel for disposal processing (CDD activation) and disposal in accordance with local regulations or through Defense Reutilization Marketing Office.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

1. Verify that Genset (Figure 3, item 4) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.

REMOVAL – Continued

3. Remove rear access panel (Figure 3, Item 3) of Genset (Figure 3, Item 4) and set aside.

4. Remove battery fuse (Figure 3, Item 9). See Removal procedure described in this WP.

5. Remove nut (Figure 3, Item 11) that secures black cable (Figure 3, Item 12) to negative (-) terminal of battery (Figure 2, Item 8). Disconnect black cable (Figure 2, Item 12) and move away from battery.

6. Remove and retain nut (Figure 3, Item 7) that secures red positive battery cables (Figure 3, Items 21 and 22) to positive (+) terminal of battery (Figure 3, Item 8). Disconnect red cables (Figure 3, Items 21 and 22) and move away from battery.

7. Remove cable clamp (Figure 3, Item 5) and black cable (Figure 3, Item 12) and move away from battery.

8. Remove two battery retainers (Figure 3, Item 6) and set aside. See Removal procedure described in this WP.

9. Remove batteries (Figure 3, Items 13 and 20) from battery bracket (Figure 3, Item 17) and set aside.

END OF TASK

REPLACEMENT

WARNING

When installing new battery, be observant of battery polarity (positive and negative terminals). Like polarities should NOT be next to each other. Serious injury to personnel or damage to equipment may occur.

NOTE

Ensure that hardware is present in battery terminals.

1. Set batteries (Figure 3, Items 13 and 20) into battery mounting bracket (Figure 3, Item 17).

2. Place two battery retainer(s) (Figure 3, Item 6) in approximate position over batteries (Figure 3, Items 13 and 20).

3. Install cable clamp (Figure 3, Item 5) and black cable (Figure 3, Item 12), bolt (Figure 3, Item 1) and flat washer (Figure 3, Item 2), through battery retainer (Figure 3, Item 6) and mounting bracket (Figure 3, Item 17). Secure with nut (Figure 3, Item 18) and flat washer (Figure 3, Items 19).

4. Loosely install three bolts (Figure 3, Item 1), flat washers (Figure 3, Item 2) through battery retainers (Figure 3, Item 6) and mounting bracket (Figure 3, Item 17) secure with three nuts (Figure 3, Item 18) and flat washers (Figure 3, Items 19).

5. To ensure equal pressure, alternately tighten nuts (Figure 3, Item 18) until battery retainer (Figure 3, Item 6) is secure.

6. Install positive battery cables (Figure 3, Items 21 and 22) to positive (+) terminal of battery (Figure 3, Item 8) and secure with nut (Figure 3, Item 7).

7. Install battery fuse (Figure 3, Item 9). See Replacement procedure described in this WP.

8. Install black cable (Figure 3, Item 12) to negative (-) terminal of battery (Figure 3, Item 8) and secure using nut (Figure 3, Item 11).

REPLACEMENT – Continued

9. Install and secure access door (Figure 3, Item 3).

10. Install cargo restraints (not shown).

11. Start Genset (Figure 3, Item 4) in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

MOUNTING BRACKET (VERSION 1)

REMOVAL

1. Remove two batteries (Figure 3, Items 13 and 20). See Removal procedure described in this WP.

2. Remove and retain two bolts (Figure 3, Item 14), lock washers (Figure 3, Item 15), and flat washers (Figure 3, Item 16) that secure battery mounting bracket (Figure 3, Item 17) to Genset (Figure 3, Item 9).

3. Remove and properly discard battery mounting bracket (Figure 3, Item 17).

END OF TASK

REPLACEMENT

1. Install battery mounting bracket (Figure 3, Item 17) into Genset (Figure 3, Item 4) and secure using two bolts (Figure 3, Item 14), lock washers (Figure 3, Item 15), and flat washers (Figure 3, Item 16).

WARNING

When installing batteries, be observant of battery polarity (positive and negative terminals). Like polarities should NOT be next to each other. Serious injury to personnel or damage to equipment may occur.

2. Install two batteries (Figure 3, Items 13 and 20). See replacement procedure described in this WP.

3. Install cargo restraints (not shown).

4. Install and secure access door (Figure 3, Item 3).

5. Start Genset (Figure 3, Item 4) in accordance with Operation Under Usual Conditions (WP 0005) of this TM.

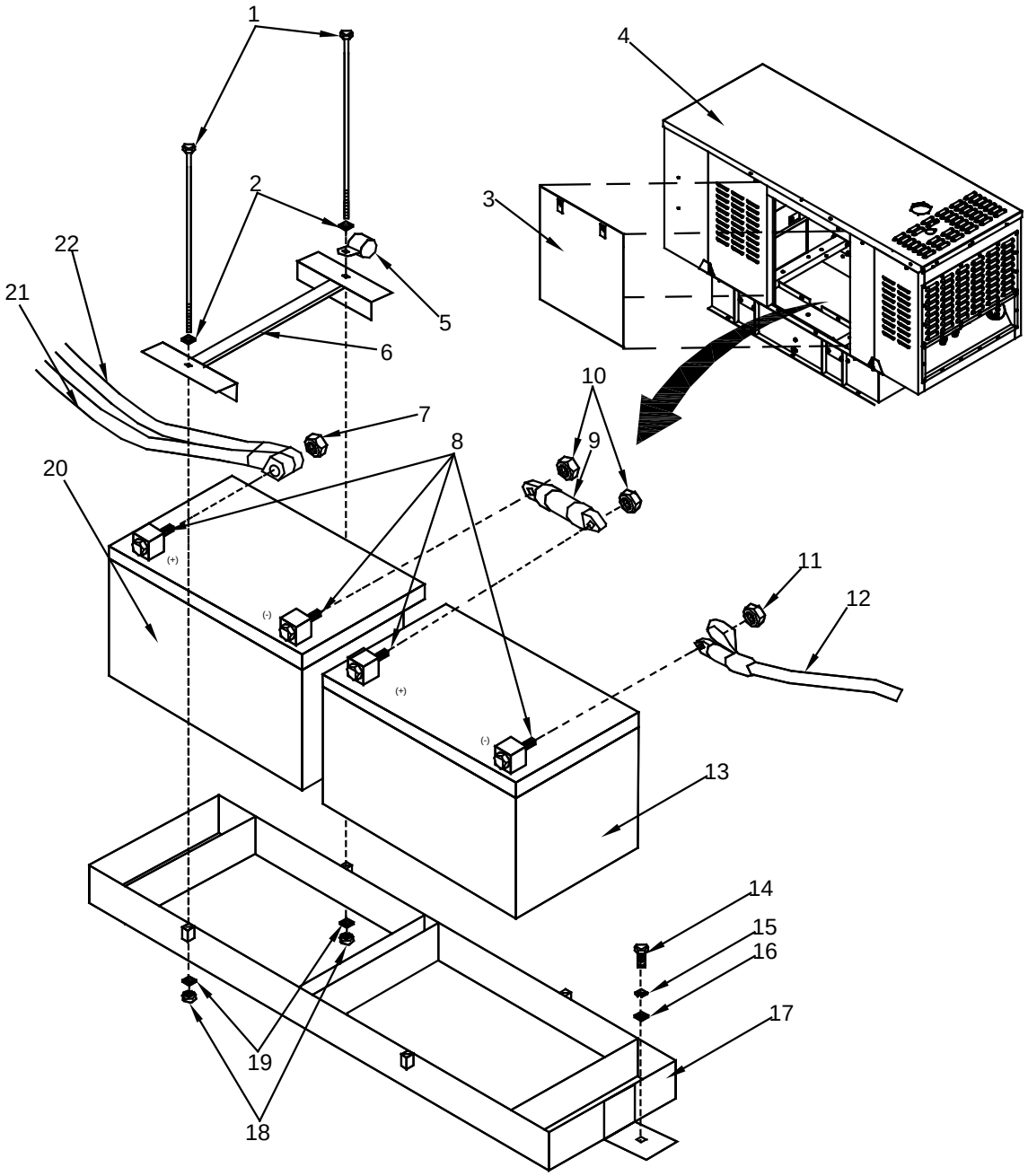

Figure 3. Battery, Retainer, and Mounting Bracket Removal/Replacement (Version 1).

END OF TASK

BATTERY, RETAINER, AND MOUNTING BRACKET REMOVAL/REPLACEMENT (VERSION 2)

INITIAL SETUP:

Tools and Special Tools
General mechanic's toolkit (WP 0165, Item 1)

Materials/Parts
Battery
Battery mounting bracket
Battery retainer

Personnel Required
One

References
WP 0005

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High DC voltage, (24 VDC) (12 VDC per battery), and amperage present at electrical connections. Do not enter Genset when operational. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Never lay tools in or around battery area. Metal tools could cause batteries to short and cause damage to batteries, electrical parts of engine, or injury to personnel.

In event of a battery venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with acid resistant rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

NOTE

The following Removal/Replacement procedures for the battery, retainer, and mounting bracket are for Version 2. For Version 1 or Version 3, refer to appropriate procedure located in this WP.

RETAINER (VERSION 2)

REMOVAL

1. Verify that Genset (Figure 4, Item 7) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove rear access panel (Figure 4, Item 6) from Genset (Figure 4, Item 7) and set aside.
3. Move terminal cover (Figure 4, Item 10) to allow access to hardware and connections.
4. Disconnect negative battery cable (Figure 4, Item 11) from battery (Figure 4, Item 9) by removing nut (Figure 4, Item 12) and bolt (Figure 4, Item 19).
5. Remove battery fuse (Figure 4, Item 8). See Removal procedure in this WP.

REMOVAL – Continued

6. Move terminal cover (Figure 4, Item 3) and remove bolt (Figure 4, Item 21) and nut (Figure 4. Item 22) to disconnect positive battery cables (Figure 4, Items 4 and 5) from battery (Figure 4, Item 20).

7. Remove battery retainers (Figure 4, Item 23) from batteries (Figure 4, Items 9 and 20) by removing two nuts (Figure 4, Item 16) and flat washers (Figure 4, Item 17) from battery bolts (Figure 4, Item 1).

NOTE

Cable clamp (Figure 4, Item 2) is present at one spot only.

8. Remove and retain cable clamp (Figure 4, Item 2). Lift retainer (Figure 4, Item 23), two bolts (Figure 4, Item 1), and flat washers (Figure 4, Item 24) off of batteries (Figure 4, Items 9 and 20).

END OF TASK

REPLACEMENT

1. Place battery retainers (Figure 4, Item 23) onto batteries (Figure 4, Items 9 and 20), aligning holes in retainer (Figure 4, Item 23) with holes on mounting bracket (Figure 4, Item 18).

2. Insert two bolts (Figure 4, Item 1) and flat washers (Figure 4, Item 24). Install cable clamp (Figure 4, Item 2). Secure using two nuts (Figure 4, Item 16) and flat washers (Figure 4, Item 17).

3. To ensure equal pressure, alternately tighten bolts (Figure 4, Item 1) until battery retainer (Figure 4, Item 23) is secure.

4. Connect positive battery cables (Figure 4, Items 4 and 5) to battery (Figure 4, Item 20) and secure with bolt (Figure 4, Item 21) and nut (Figure 4, Item 22). Cover connection with terminal cover (Figure 4, Item 3).

5. Install battery fuse (Figure 4, Item 8). See Replacement procedure in this WP.

6. Connect negative battery cable (Figure 4, Item 11) to battery (Figure 4, Item 9) and secure with bolt (Figure 4, Item 19) and nut (Figure 4, Item 12). Cover connection with terminal cover (Figure 4, Item 10).

7. Install and secure access door (Figure 4, Item 6) to Genset (Figure 4, Item 7).

8. Start Genset (Figure 4, Item 7) in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

BATTERY (VERSION 2)

REMOVAL

WARNING

High DC voltage, (24 VDC) (12 VDC per battery), and amperage present at electrical connections. Do not enter Genset when operational. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

Deplete batteries should be turned in to designated personnel for disposal processing (CDD activation) and disposal in accordance with local regulations or through Defense Reutilization Marketing Office.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

1. Verify that Genset (Figure 4, Item 7) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear panel of Genset.

3. Remove access panel (Figure 4, Item 6) of Genset (Figure 4, Item 7) and set aside.

4. Remove and retain nut (Figure 4, Item 12) and bolt (Figure 4, Item 19) that secures black cable (Figure 4, Item 11) to negative (-) terminal of battery (Figure 4, Item 9). Move black cable (Figure 4, Item 11) away from battery (Figure 4, Item 9).

5. Remove battery fuse (Figure 4, Item 8). See Removal procedure described in the WP.

6. Remove and retain nut (Figure 4, Item 22) and bolt (Figure 2, Item 21) that secure positive battery cables (Figure 4, Items 4 and 5) to positive (+) terminal of battery (Figure 4, Item 20).

7. Remove battery retainer (Figure 4, Item 23) and set aside. See Removal procedure described in this WP.

8. Remove batteries (Figure 4, Items 9 and 20) from battery bracket (Figure 4, Item 18) and set aside.

END OF TASK

REPLACEMENT

WARNING

When installing a new battery, be observant of polarity (positive and negative terminals). Like polarities should NOT be next to each other. Serious injury to personnel or damage to equipment may occur.

NOTE

Ensure that hardware is present in battery terminals.

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for generic torque requirements.

1. Set batteries (Figure 4, Items 9 and 20) into battery mounting bracket (Figure 4, Item 18).
2. Place two battery retainer(s) (Figure 4, Item 23) in approximate position over batteries (Figure 4, Items 9 and 20).
3. Insert black cable (Figure 4, Item 11) through cable clamp (Figure 4, Item 2) and position cable clamp over battery retainer (Figure 4, Item 23).
4. Loosely install four bolts (Figure 4, Item 1) and flat washers (Figure 4, Item 24), through battery retainers (Figure 4, Item 23) and mounting bracket (Figure 4, Item 18) and secure with four flat washers (Figure 4, Item 17) and nuts (Figure 4, Item 16). For more detailed information on the replacement of the battery retainers, see Retainer Replacement procedure in this WP.
5. To ensure equal pressure, alternately tighten nuts (Figure 4, Item 16) until battery retainer (Figure 4, Item 23) is secure.
6. Install positive battery cables (Figure 4, Items 4 and 5) to positive (+) terminal of battery (Figure 4, Item 20) and secure with bolt (Figure 4, Item 21) and nut (Figure 4, Item 22). Cover connection with terminal cover (Figure 4, Item 3).
7. Install battery fuse (Figure 4, Item 8). See Replacement procedure described in this WP.
8. Install black cable (Figure 4, Item 11) to negative (-) terminal of battery (Figure 4, Item 9) and secure with bolt (Figure 4, Item 19) and nut (Figure 4, Item 12). Cover connection with terminal cover (Figure 4, Item 10).
9. Install and secure access door (Figure 4, Item 6) onto Genset (Figure 4, Item 7).
10. Install cargo restraints (not shown).
11. Start Genset (Figure 4, Item 7) in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

MOUNTING BRACKET (VERSION 2)

REMOVAL

1. Verify that Genset (Figure 4, Item 7) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove access door (Figure 4, Item 6) from Genset (Figure 4, Item 7) and set aside.
3. Remove two batteries (Figure 4, Items 9 and 20). See Removal procedure described in this WP.
4. Remove and retain two bolts (Figure 4, Item 13), lock washers (Figure 4, Item 14), and flat washers (Figure 4, Item 15) that secure battery mounting bracket (Figure 4, Item 18) to Genset (Figure 4, Item 7).
5. Remove and properly discard battery mounting bracket (Figure 4, Item 18).

END OF TASK

REPLACEMENT

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for generic torque requirements.

1. Install battery mounting bracket (Figure 4, Item 18) into Genset (Figure 4, Item 7) and secure using two bolts (Figure 4, Item 13), lock washers (Figure 4, Item 14), and flat washers (Figure 4, Item 15).

WARNING

When installing a new battery, be observant of polarity (positive and negative terminals). Like polarities should NOT be next to each other. Serious injury to personnel or damage to equipment may occur.

2. Install two batteries (Figure 4, Items 9 and 20). See Replacement procedure described in this WP.
3. Install and secure access door (Figure 4, Item 6) onto Genset (Figure 4, Item 7).
4. Start Genset (Figure 4, Item 7) in accordance with Genset Start Procedure (WP 0005) of this TM.

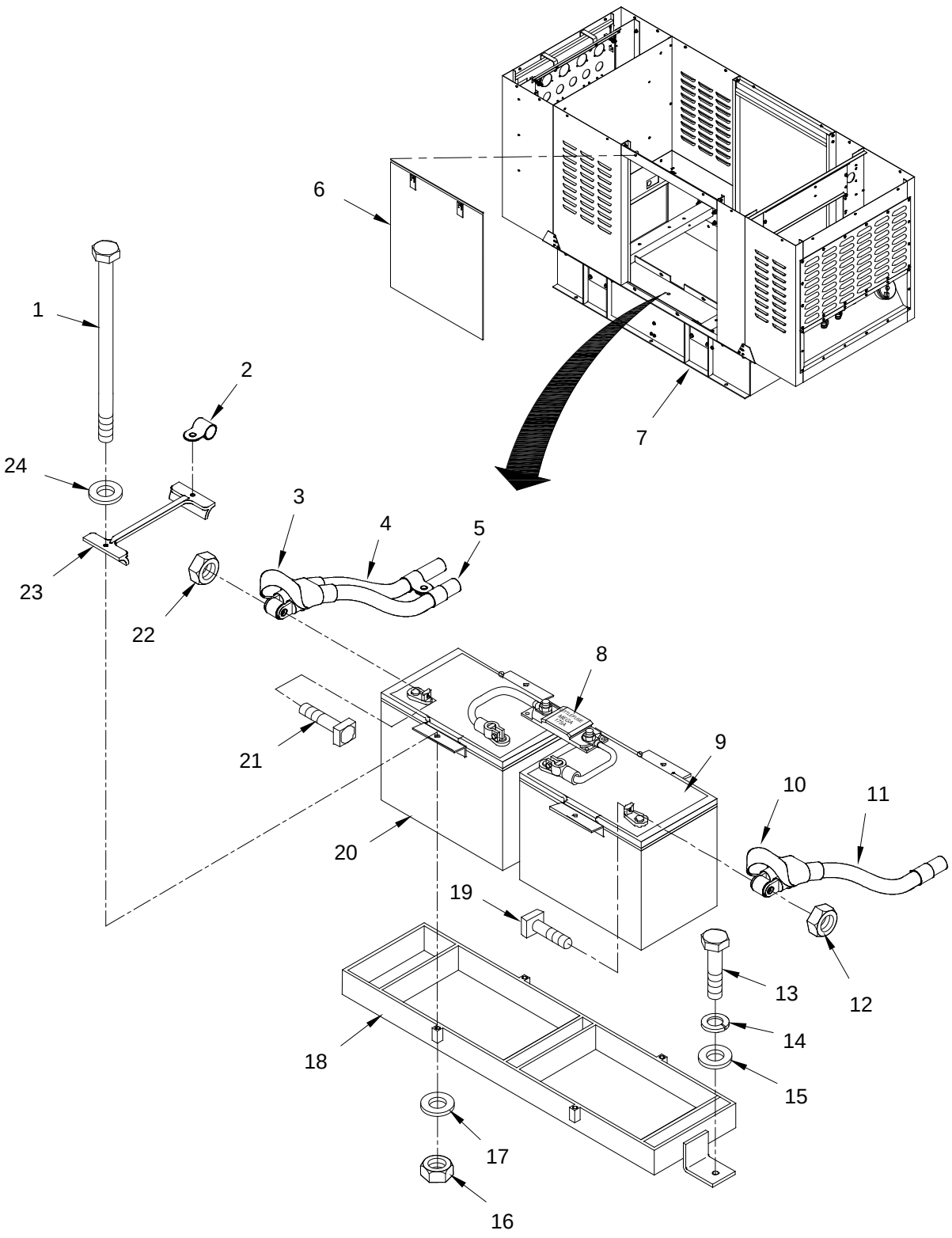

Figure 4. Battery, Retainer, and Mounting Bracket Removal/Replacement (Version 2).

END OF TASK

BATTERY, RETAINER, AND MOUNTING BRACKET REMOVAL/REPLACEMENT (VERSION 3)

INITIAL SETUP:

Tools and Special Tools
General mechanic's toolkit (WP 0165, Item 1)

Materials/Parts
Battery
Battery mounting bracket
Battery retainer

Personnel Required
One

References
WP 0005

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High DC voltage, (24 VDC) (12 VDC per battery), and amperage present at electrical connections. Do not enter Genset when operational. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Never lay tools in or around battery area. Metal tools could cause batteries to short and cause damage to batteries, electrical parts of engine, or injury to personnel.

In event of a battery venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with acid resistant rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

NOTE

The following Removal/Replacement procedures for the battery, retainer, and mounting bracket are for Version 3. For Version 1 or Version 2, refer to appropriate procedure located in this WP.

RETAINER (VERSION 3)

REMOVAL

1. Verify that Genset (Figure 5, Item 11) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.

3. Remove rear access panel (Figure 5, Item 7) from Genset (Figure 5, Item 11) and set aside.

4. Remove two nuts (Figure 5, Item 15) and bolts (Figure 5, Item 13) that secure negative battery cable (Figure 5, Item 16) to battery (Figure 5, Item 21) via terminal lug (Figure 5, Item 14). Remove terminal lug (Figure 5, Item 14) and set off to side.

5. Remove battery fuse (Figure 5, Item 12). See Removal procedure in this WP.

REMOVAL – Continued

6. Remove two nuts (Figure 5, Item 26) and bolts (Figure 5, Item 10) that secure positive battery cables (Figure 5, Items 2 and 8) to battery (Figure 5, Item 25) via terminal lug (Figure 5, Item 9) and terminal cover (Figure 5, Item 27). Remove terminal lug (Figure 5, Item 9) and set off to side.

7. Remove bolt (Figure 5, Item 6), lock washer (Figure 5, Item 5), flat washer (Figure 5, Item 4) and two cable clamps (Figure 5, Item 3) that secure positive battery cables (Figure 5, Items 2 and 8) to battery (Figure 5, Item 25).

8. Remove battery retainer (Figure 5, Item 28) by removing two nuts (Figure 5, Item 22) and flat washers (Figure 5, Item 23) from battery bolts (Figure 5, Item 1). Remove and retain cable clamp (Figure 5, Item 30). Lift retainer (Figure 5, Item 28), two bolts (Figure 5, Item 1), and flat washers (Figure 5, Item 29) off of batteries (Figure 5, Items 21 or 25).

END OF TASK

REPLACEMENT

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for generic torque requirements.

1. Place battery retainer(s) (Figure 5, Item 28) onto batteries (Figure 5, Items 21 or 25), aligning holes in retainer (Figure 5, Item 28) with holes on mounting bracket (Figure 5, Item 24).

2. Insert two bolts (Figure 5, Item 1) and flat washers (Figure 5, Item 29). Install cable clamp (Figure 5, Item 30). Secure using two nuts (Figure 5, Item 22) and flat washers (Figure 5, Item 23).

3. To ensure equal pressure, alternately tighten bolts (Figure 5, Item 1) until battery retainer (Figure 5, Item 28) is secure.

4. Position terminal lug (Figure 5, Item 9) onto positive (+) terminal on battery (Figure 5, Item 25).

5. Connect positive battery cables (Figure 5, Items 2 and 8) and secure with two bolts (Figure 5, Item 10) and nuts (Figure 5, Item 26) via terminal lug (Figure 5, Item 9) and cover terminal (Figure 5, Item 27).

6. Position terminal lug (Figure 5, Item 14) onto negative (-) terminal on battery (Figure 4, Item 21).

7. Connect negative battery cable (Figure 5, Item 16) and secure with two bolts (Figure 5, Item 13) and nuts (Figure 5, Item 15) via terminal lug (Figure 5, Item 14).

8. Install battery fuse (Figure 5, Item 12). See Replacement procedure in this WP.

9. Secure positive cables (Figure 5, Items 2 and 8) with bolt (Figure 5, Item 6), lock washer (Figure 5, Item 5), flat washer (Figure 5, Item 4), and two cable clamps (Figure 5, Item 3).

10. Install and secure access door (Figure 5, Item 7) onto Genset (Figure 5, Item 11).

11. Install cargo restraints (not shown).

12. Start Genset (Figure 5, Item 11) in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

BATTERY (VERSION 3)

REMOVAL

WARNING

High DC voltage, (24 VDC) (12 VDC per battery), and amperage present at electrical connections. Do not enter Genset when operational. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

Deplete batteries should be turned in to designated personnel for disposal processing (CDD activation) and disposal in accordance with local regulations or through Defense Reutilization Marketing Office.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

1. Verify that Genset (Figure 5, Item 11) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear panel of Genset.
3. Remove access panel (Figure 5, Item 7) of Genset (Figure 5, Item 11) and set aside.
4. Remove two nuts (Figure 5, Item 15) and bolts (Figure 5, Item 13) that secure black cable (Figure 5, Item 16) to negative (-) terminal of battery (Figure 5, Item 21) via terminal lug (Figure 5, Item 14). Move black cable (Figure 5, Item 16) away from battery (Figure 5, Item 21).
5. Remove battery fuse (Figure 5, Item 12). See Removal procedure described in this WP.
6. Remove two nuts (Figure 5, Item 26) and bolts (Figure 5, Item 10) that secure positive battery cables (Figure 5, Items 2 and 8) to positive (+) terminal of battery (Figure 5, Item 25) via terminal lug (Figure 5, Item 9) and terminal cover (Figure 5, Item 27). Move positive cables (Figure 5, Items 2 and 8) away from battery (Figure 5, Item 25).
7. Remove battery retainer (Figure 5, Item 28) and set aside. See Removal procedure described in this WP.
8. Remove batteries (Figure 5, Items 21 and 25) from battery bracket (Figure 5, Item 24) and set aside.

END OF TASK

REPLACEMENT

WARNING

When installing a new battery, be observant of polarity (positive and negative terminals). Like polarities should NOT be next to each other. Serious injury to personnel or damage to equipment may occur.

NOTE

Ensure that hardware is present in battery terminals.

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for generic torque requirements.

1. Set batteries (Figure 5, Items 21 and 25) into battery mounting bracket (Figure 5, Item 24).
2. Place two battery retainer(s) (Figure 5, Item 28) in approximate position over batteries (Figure 5, Items 21 and 25).
3. Install battery retainers (Figure 5, Item 28) as described in this WP.
4. Position terminal lug (Figure 5, Item 9) onto positive (+) terminal on battery (Figure 5, Item 25).
5. Install positive battery cables (Figure 5, Items 2 and 8) to positive (+) terminal of battery (Figure 5, Item 25) and secure with two bolts (Figure 5, Item 10) and nuts (Figure 5, Item 26) via terminal lug (Figure 5, Item 9) and terminal cover (Figure 5, Item 27).
6. Install battery fuse (Figure 5, Item 12). See Replacement procedure described in this WP.
7. Position terminal lug (Figure 5, Item 14) onto (-) terminal on battery (Figure 5, Item 21).
8. Install negative battery cable (Figure 5, Item 16) to negative (-) terminal of battery (Figure 5, Item 21) and secure with two bolts (Figure 5, Item 13) and nuts (Figure 5, Item 15) via terminal lug (Figure 5, Item 14).
9. Install and secure access door (Figure 5, Item 7) onto Genset (Figure 5, Item 11).
10. Install cargo restraints (not shown).
11. Start Genset (Figure 5, Item 11) in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

MOUNTING BRACKET (VERSION 3)

REMOVAL

1. Verify that Genset (Figure 5, item 11) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove access door (Figure 5, Item 7) of Genset (Figure 5, Item 11) and set aside.

3. Remove two batteries (Figure 5, Items 21 and 25). See Removal procedure described in this WP.

4. Remove and retain two bolts (Figure 5, Item 18), lock washers (Figure 5, Item 19), and flat washers (Figure 5, Item 20) that secure battery mounting bracket (Figure 5, Item 24) to Genset (Figure 5, Item 11).

5. Remove and properly discard battery mounting bracket (Figure 5, Item 24).

END OF TASK

REPLACEMENT

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for generic torque requirements.

1. Install battery mounting bracket (Figure 5, Item 24) into Genset (Figure 5, Item 11) and secure using two bolts (Figure 5, Item 18), lock washers (Figure 5, Item 19), and flat washers (Figure 5, Item 20).

WARNING

When installing a new battery, be observant of polarity (positive and negative terminals). Like polarities should NOT be next to each other. Serious injury to personnel or damage to equipment may occur.

2. Install two batteries (Figure 5, Items 21 and 25). See Replacement procedure described in this WP.

3. Install and secure access door (Figure 5, Item 7) to Genset (Figure 5, Item 11).

4. Start Genset (Figure 5, Item 11) in accordance with Genset Start Procedure (WP 0005) of this TM.

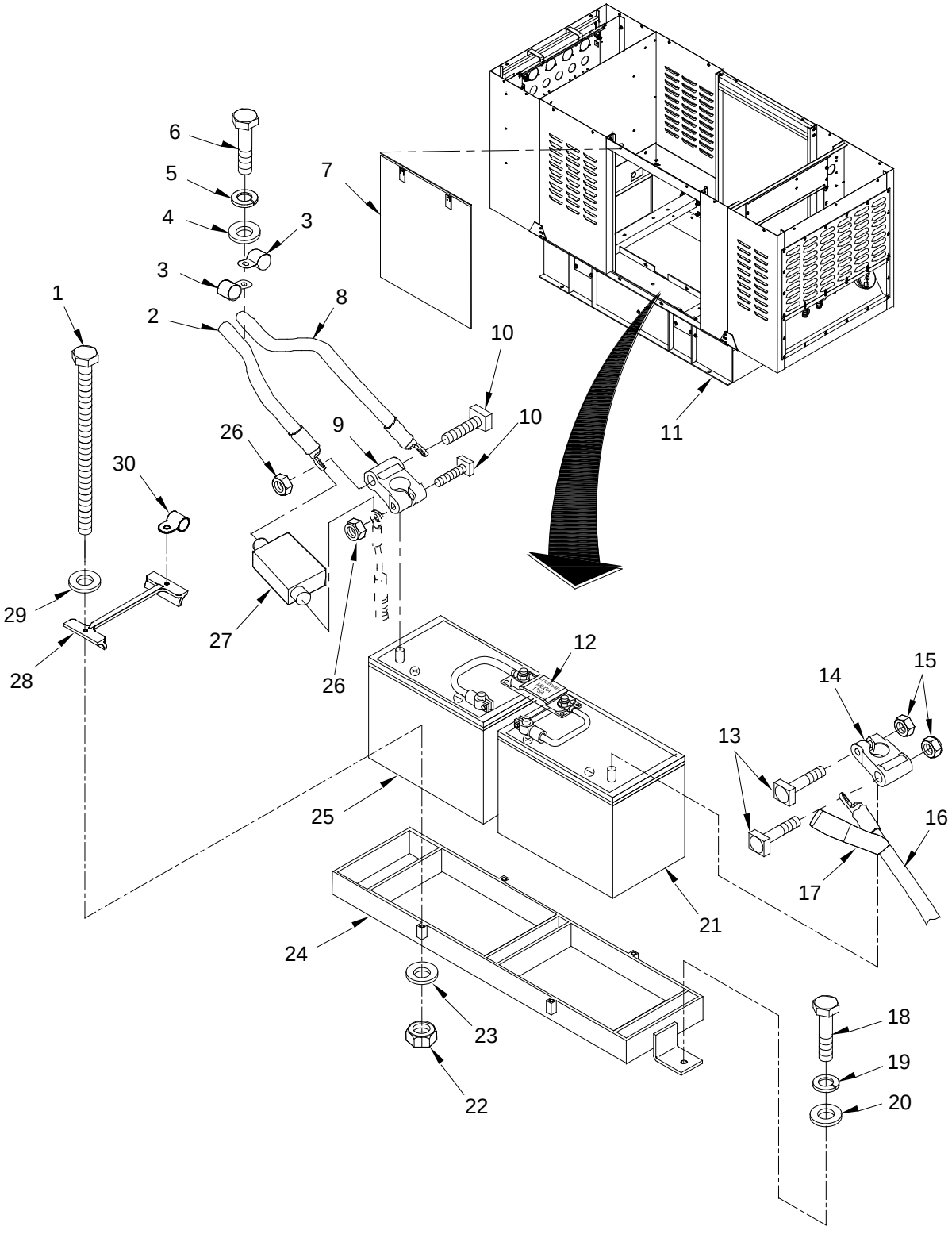

Figure 5. Battery, Retainer, and Mounting Bracket Removal/Replacement (Version 3).

END OF TASK

BATTERY WARMER REMOVAL/REPLACEMENT (VERSION 1)

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

References
WP 0005

Materials/Parts
Battery warmer
Teflon tape (WP 0168, Item 58)
Rubber gloves (WP 0168, Item 24)

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

Personnel Required
Two

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

NOTE

The following Removal/Replacement procedure for the battery warmer is for Version 1. For Version 2 or Version 3, refer to appropriate procedure located in this WP.

BATTERY WARMER (VERSION 1)

REMOVAL

1. Verify that Genset (Figure 6, Item 2) has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Stop Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 6, Item 1) of Genset.
3. Remove rear access panel (Figure 6, Item 1) from Genset (Figure 6, Item 2) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in this WP) or, if necessary, remove batteries as described in this WP.

REMOVAL – Continued

NOTE

When performing the following step, use two wrenches. One to loosen hose (Figure 6, Item 3) and one to keep associated hardware on battery warmer (Figure 6, Item 4) stationary.

5. Disconnect two hoses (Figure 6, Item 3) (located on under side of Genset) from battery warmer (Figure 6, Item 4) and place into drain bucket.

NOTE

The following step may require two personnel.

6. Remove and retain bolt (Figure 6, Item 8), flat washer (Figure 6, Item 7), lock washer (Figure 6, Item 6), and nut (Figure 6, Item 5) that secure battery warmer (Figure 6, Item 4) to Genset (Figure 6, Item 2).

7. Remove battery warmer (Figure 6, Item 4).

END OF TASK

REPLACEMENT

1. Wrap threads on battery warmer (Figure 6, Item 4) with anti-seize tape.

NOTE

The following step may require two personnel.

2. Install battery warmer (Figure 6, Item 4) to underside of Genset (Figure 6, Item 2) and secure with bolt (Figure 6, Item 8), flat washer (Figure 6, Item 7), lock washer (Figure 6, Item 6), and nut (Figure 6, Item 5). Tighten hardware finger loose at this time.

NOTE

When performing the following step, use two wrenches, one to tighten hose (Figure 6, Item 3) and one to keep associated hardware on battery warmer (Figure 6, Item 4) stationary.

3. Connect two hoses (Figure 6, Item 3) (located on under side of Genset) to battery warmer (Figure 6, Item 4).

4. Finish tightening bolt (Figure 6, Item 8), flat washer (Figure 6, Item 7), lock washer (Figure 6, Item 6), and nut (Figure 6, Item 5).

5. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in this WP or if batteries were removed to perform this procedure, reinstall batteries as described in this WP).

6. Install and secure rear access panel (Figure 6, Item 1) on Genset (Figure 6, Item 2).

7. Install cargo restraints (not shown).

8. Start Genset (Figure 6, Item 2) in accordance with Genset Start Procedure (WP 0005) of this TM.

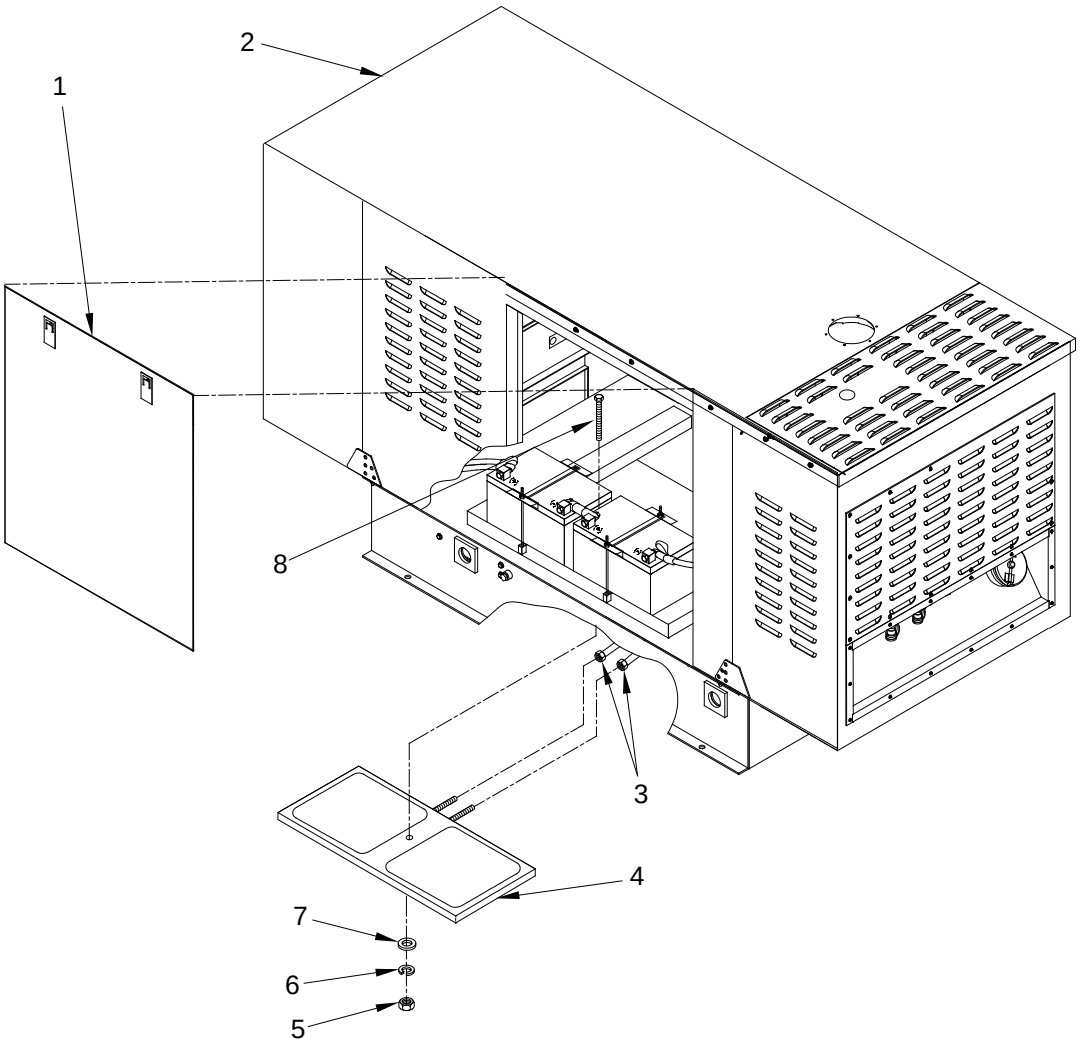

Figure 6. Battery Warmer Removal/Replacement (Version 1).

END OF TASK

BATTERY WARMER REMOVAL/REPLACEMENT (VERSION 2 AND 3)

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

References
WP 0005

Materials/Parts
Battery warmer
Teflon tape (WP 0168, Item 58)
Rubber gloves (WP 0168, Item 24)

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

Personnel Required
Two

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

NOTE

The battery warmer for Version 2 and Version 3 are removed and replaced in the same manner. For Version 1, refer to procedure earlier in this WP.

BATTERY WARMER (VERSION 2 AND 3)

REMOVAL

1. Verify that Genset (Figure 7, Item 2) has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Stop Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 7, Item 1) of Genset.
3. Remove rear access panel (Figure 7, Item 1) of Genset (Figure 7, Item 2) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (Figure 7, Item 3) (if necessary, refer to procedure in this WP) or, if necessary, remove batteries as described in this WP.

REMOVAL – Continued

NOTE

When performing the following step, use two wrenches. One to loosen hose (Figure 7, Item 4) and one to keep associated hardware on battery warmer (Figure 7, Item 5) stationary.

5. Disconnect two hoses (Figure 7, Item 4) (located on underside of Genset) from battery warmer (Figure 7, Item 5) and place into drain bucket.

NOTE

The following step may require two personnel.

6. Remove and retain bolt (Figure 7, Item 9), two flat washers (Figure 7, Items 7 and 8), and nut (Figure 7, Item 6) that secure battery warmer (Figure 7, Item 5) to Genset (Figure 7, Item 2).

7. Remove battery warmer (Figure 7, Item 5).

END OF TASK

REPLACEMENT

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for generic torque requirements.

1. Wrap threads on battery warmer (Figure 7, Item 5) with anti-seize tape.

NOTE

The following step may require two personnel.

2. Install battery warmer (Figure 7, Item 5) to underside of Genset (Figure 7, Item 2) and secure with bolt (Figure 7, Item 9), two flat washers (Figure 7, Items 7 and 8), and nut (Figure 7, Item 6). Tighten hardware finger loose at this time.

NOTE

When performing the following step, use two wrenches, one to tighten hose (Figure 7, Items 4) and one to keep associated hardware on battery warmer (Figure 7, Item 5) stationary.

3. Connect two hoses (Figure 7, Item 4) (located on underside of Genset) to battery warmer (Figure 7, Item 5).

4. Finish tightening bolt (Figure 7, Item 9), flat washers (Figure 7, Items 7 and 8), and nut (Figure 7, Item 6).

5. Connect battery ground cable (black) to battery ground terminal (Figure 7, Item 3) (if necessary, refer to procedure in this WP or if batteries were removed to perform this procedure, reinstall batteries as described in this WP).

6. Install and secure rear access panel (Figure 7, Item 1).

7. Install cargo restraints (not shown).

8. Start Genset (Figure 7, Item 2) in accordance with Genset Start Procedure (WP 0005) of this TM.

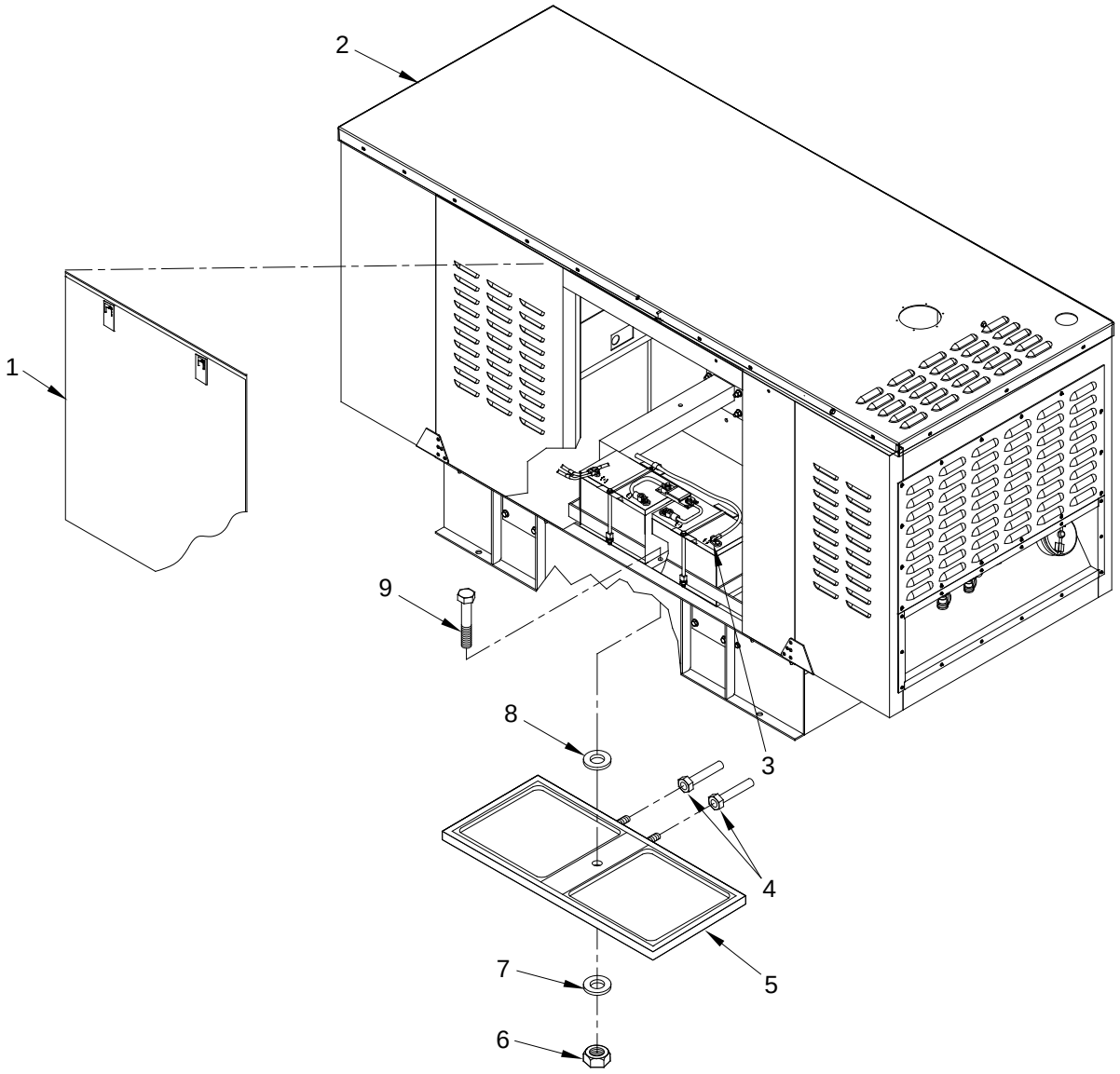

Figure 7. Battery Warmer Removal/Replacement (Version 2 and 3).

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET OIL AND OIL FILTER

GENERAL

This work package provides information on the service, removal and replacement of the oil and oil filter for the Genset engine.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset is in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

OIL AND OIL FILTER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Drain pan
Oil filter wrench

Materials/Parts
Oil filter
Oil (WP 0168, Items 35 or 36)
Cloth, cleaning (WP 0168, Item 14)
Teflon tape (WP 0168, Item 58)
Rubber gloves (WP 0168, Item 24)

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

REMOVAL

NOTE

If needed, run the Genset (Figure 1, Item 1) to bring engine to operating temperature.

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the front and rear access panels (Figure 1, Items 2 and 5) on Genset (Figure 1, Item 1) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

Oil drain plug (Figure 1, Item 7) is located on the front base of the Genset enclosure.

5. Place drain pan under oil drain plug (Figure 1, Item 7). Remove and retain oil drain plug (Figure 1, Item 7).

NOTE

If an oil drain hose is available, insert one end into the engine oil outlet and place opposite end in drain pan. Use of an oil drain hose will reduce spillage.

Collect oil in an appropriate chemical-resistant container for disposal through the local servicing Defense Reutilization and Marketing Office.

6. Open the engine oil drain valve (Figure 1, Item 6) inside the Genset enclosure. Drain oil into drain pan.

REMOVAL - Continued

NOTE

Prior to performing the following step, place absorbent towels under oil filter.

When performing the following step, be observant of all items around the oil filter.

7. Loosen oil filter (Figure 1, Item 3) from oil filter mount (Figure 1, Item 4) with oil filter wrench until finger loose. Finish removing oil filter by hand.

8. Discard oil, oil filter, and any oil soaked rags in accordance with proper HAZMAT procedures.

9. Using a clean lint free cloth clean the oil filter mount.

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following step, inspect oil filter for gasket. Inspect gasket for cuts, nicks, or other damage. If gasket is missing or damaged, do not use oil filter.

1. Using clean oil, apply a thin coat of oil to the oil filter seal.

CAUTION

When the following step is being performed, do not force oil filter (Figure 1, Item 3) or cross thread. Failure to observe this caution can result in damage to the engine.

2. Install oil filter (Figure 1, Item 3) onto oil filter mount (Figure 1, Item 4). Tighten until hand tight.

NOTE

When performing the following step, DO NOT over tighten oil filter (Figure 1, Item 3).

3. Tighten oil filter (Figure 1, Item 3) an additional ¼ turn with oil filter wrench.

4. If using a drain hose, remove hose and close oil drain valve (Figure 1, Item 6).

5. Wrap oil drain plug (Figure 1, Item 7) with Teflon tape, install, and tighten.

6. Remove and retain oil filler cap.

NOTE

When performing the following step, use heave duty lubricating oil meeting the requirements of MIL-L-2104C/D, AAPICD Series 3. See Engine Oil Recommendations (Table 1) for proper oil viscosity.

Refer to Expendable and Durable Items (WP 0165) for NSN and other information on oil listed in table below.

REPLACEMENT – Continued

NOTE

When performing the following step, DO NOT over fill engine.

7. Add 8.6 quarts (8.13 liters) of oil to engine and allow oil to settle (approximately 1 min).
8. Check engine oil level at dipstick. If necessary, add more oil until dipstick reads between lines.
9. Replace engine oil filler cap.
10. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
11. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM and allow engine to run for a few minutes to circulate oil through engine.
12. Shut down the Genset in accordance with Genset Stop Procedure (WP 0005) and allow a few minutes for the oil to settle.

NOTE

Engine must be turned off to obtain an accurate reading on the dipstick. The reading on the dipstick should be between the two marks on the dipstick.

13. Check oil level with the dipstick. If oil level is still low, add additional oil. If dipstick indicates proper oil level, re-insert the dipstick and verify that oil filler cap is secure.
14. Wipe off any oil that has spilled.
15. Install front and rear access panels (Figure 1, Items 2 and 5).
16. Install cargo restraints (not shown).
17. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Engine Oil Recommendations.

Ambient Temperature	Mono-grade	Multi-Grade
Below 5°F (–15°C)	5W	5W/20
Between 5°F (–15°C) and 50°F (10°C)	10W	10W/30
Between 40°F (5°C) and 85°F (30°C)	20W	10W/30 or 15W/40
Above 85°F (30°C)	30W	15W/40 or 20W/40

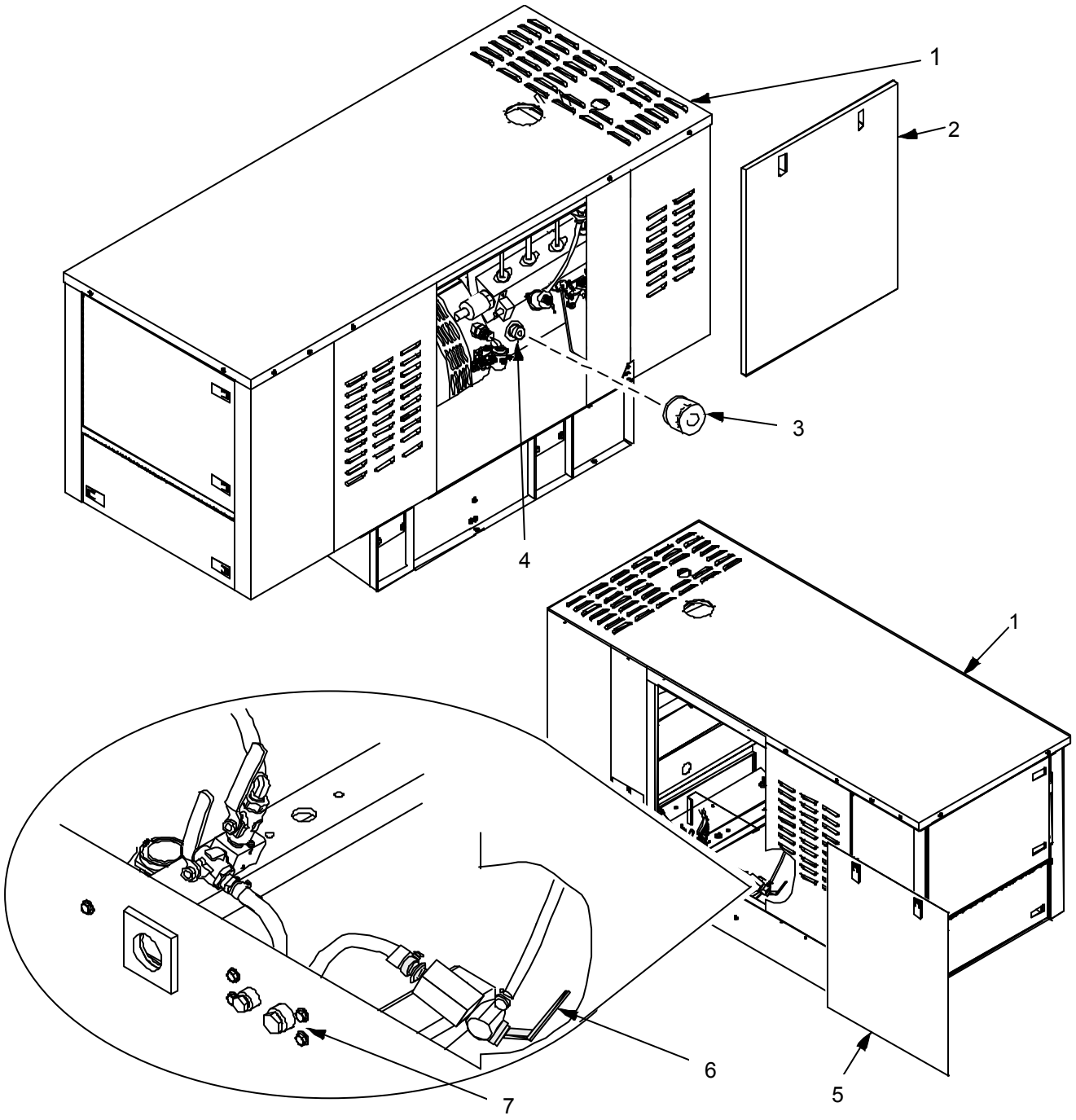

Figure 1. Oil and Filter Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET AIR FILTER

GENERAL

This work package provides information on the removal/replacement of the Genset air intake filter.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

AIR INTAKE FILTER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Safety Glasses

Materials/Parts
Air filter

Personnel Required
One

References
WP 0005

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure1, Item 2) of Genset (Figure1, Item 6).
3. Remove rear access panel (Figure1, Item 2) of Genset (Figure1, Item 6) and set aside.
4. Open clasps (Figure1, Item 3) on engine air intake filter cover (Figure1, Item 4). Remove air intake filter cover (Figure1, Item 4) and set aside.
5. Remove air intake filter (Figure1, Item 1) and properly discard.

END OF TASK

REPLACEMENT

1. Insert new air intake filter (Figure1, Item 1).

NOTE

Drain (Figure1, Item 5) on air intake filter cover (Figure1, Item 4) should face down.

When air intake filter cover (Figure1, Item 4) is properly locked into place, cover should not rotate.

2. Replace air intake filter cover (Figure1, Item 4) and rotate slightly to ensure proper seating.
3. Align clasps (Figure1, Item 3) on engine air intake filter cover (Figure1, Item 4) and secure.
4. Install rear access panel (Figure1, Item 2) of Genset (Figure1, Item 6).

REPLACEMENT – Continued

5. Install cargo restraints (not shown).

6. Start Genset (Figure1, Items 6) in accordance with Genset Start Procedure (WP 0005) of this TM.

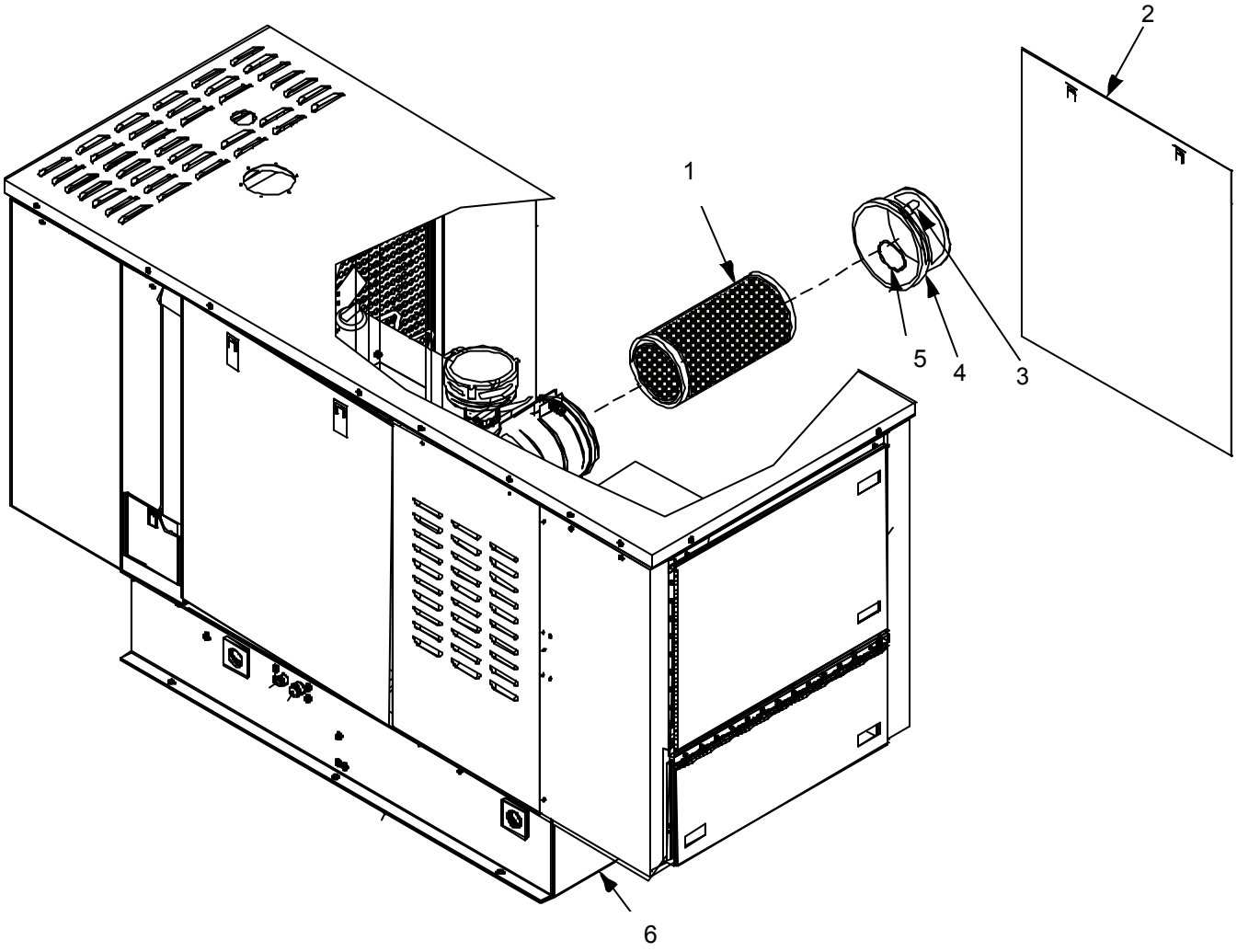

Figure 1. Air Intake Filter Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET FUEL FILTER

GENERAL

This work package provides information on the services and removal/replacement of the Genset fuel filter. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

FUEL FILTER REMOVAL/INSPECT/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Drain pan
Oil filter wrench
Rubber gloves (WP 0168, Item 24)
Safety Glasses

Materials/Parts
Fuel filter

Personnel Required
One

References
WP 0005, WP 0041, WP 0045

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

REMOVAL

NOTE

If needed, run the Genset (Figure 1, Item 1) to bring engine to operating temperature.

1. Verify that Genset (Figure 1, Item 4) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove rear access panel (Figure 1, Item 2) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

The fuel filter (Figure 1, Item 1) is located by the batteries and the low oil pressure cut-off SWITCH.

Place absorbent pads under fuel filter (Figure 1, Item 1) to catch any spillage.

5. Using the oil filter wrench, loosen fuel filter (Figure 1, Item 1).
6. Remove fuel filter (Figure 1, Item 1) and pour fuel into a clean clear container.

END OF TASK

INSPECT

1. After fuel filter has been removed, inspect fuel filter (Figure 1, Item 1) and fuel for signs of water or sediment. If excessive sediment or water is found, drain fuel tank, as described in (WP 0045), and replace fuel filter (Figure 1, Item 1).

END OF TASK

REPLACEMENT

1. Fill fuel filter (Figure 1, Item 1) with clean fuel.
2. Install fuel filter (Figure 1, Item 1) onto fuel filter mount (Figure 1, Item 3). Tighten until hand tight.

NOTE

When performing the following step, DO NOT over tighten fuel filter (Figure 1, Item 1).

3. Tighten fuel filter (Figure 1, Item 1) an additional 1/4 turn with oil filter wrench.
4. Prime the fuel system.
5. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM) and install rear access panel (not shown).
6. Install access panel (Figure 1, Item 2).
7. Install cargo restraints (not shown).
8. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

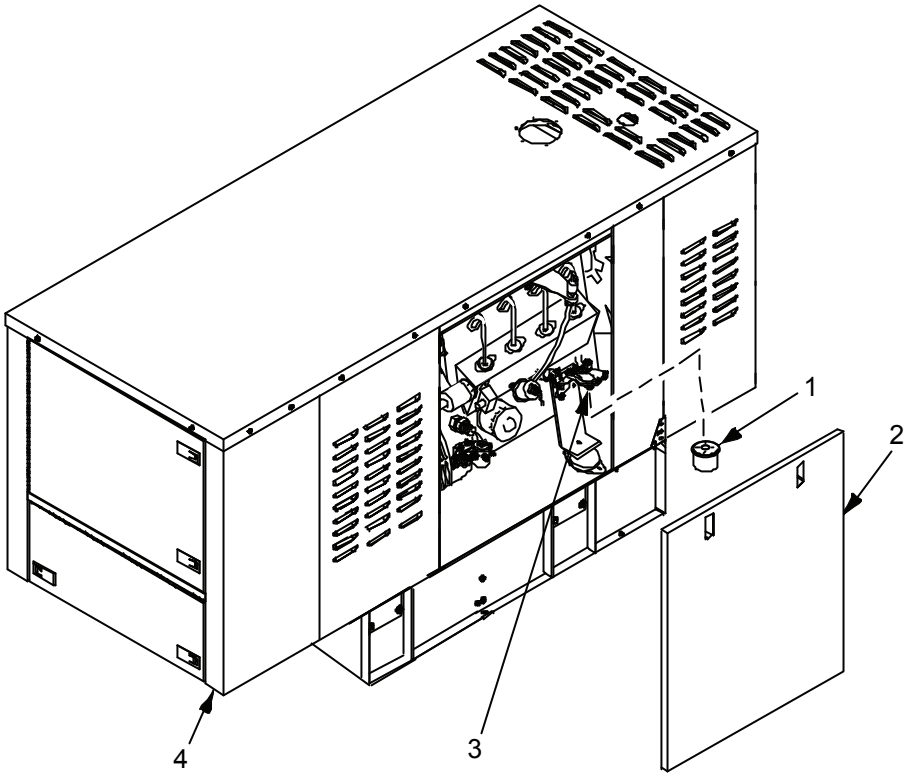

Figure 1. Fuel Filter Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET FUEL TANK

GENERAL

This work package provides information on the services and removal/replacement of the Genset fuel filter and fuel tank. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

FUEL TANK SERVICE

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Rubber gloves (WP 0168, Item 24)
Safety Glasses
Drain pan
Funnel

References
WP 0005

Equipment Condition
Genset shut down
BATTERY SWITCH – OFF

Personnel Required)
One

SERVICE

WARNING

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT perform maintenance with Genset operating.

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to TMSS-MED trailer and/or its fluid and components could result from trailer suddenly rolling or tipping.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Stop Procedure).

NOTE

The drain valve is located under the trailer behind the curbside tire. If necessary, remove fuel cap to expedite fuel flow.

Collect fuel in an appropriate chemical-resistant container for disposal through the local servicing Defense Reutilization and Marketing Office.

2. Open fuel cap.
3. Place drain pan under drain valve (Figure 1, Item 2).
4. Remove and retain plug (Figure 1, Item 3) and open drain valve (Figure 1, Item 2).
5. Once fuel tank is empty, close drain valve (Figure 1, Item 2) and install drain plug (Figure 1, Item 3).

SERVICE – Continued

6. Replenish fuel tank.
7. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

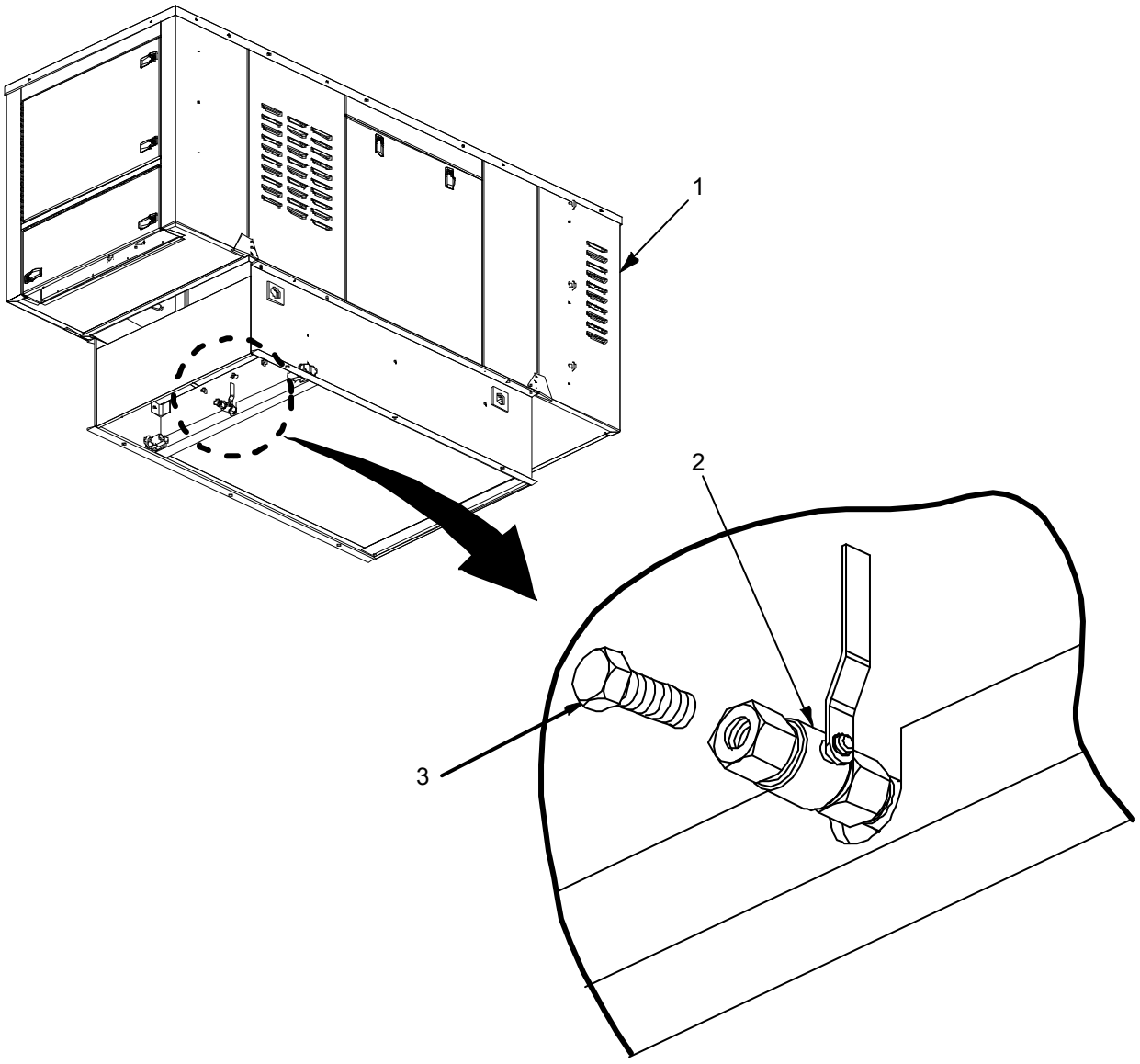

Figure 1. Genset Fuel Tank Drain Location.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET LOW OIL PRESSURE CUT-OFF SWITCH

GENERAL

This work package provides information on the removal and replacement of the Genset low oil pressure cut off switch. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

LOW OIL PRESSURE CUT-OFF SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Safety glasses

References
WP 0005, WP 0041

Materials/Parts
Low oil pressure cut-off switch
Anti-seize compound (WP 0168, Item 3)
Cloth, cleaning (WP 0168, Item 14)

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

Personnel Required
One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset (Figure 1, Item 1).
3. Remove the access panel (Figure 1, Item 2) and set aside.

NOTE

The low oil pressure cut-off switch (Figure 1, Item 5) is located on the right side of engine next to oil pressure sending unit.

4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
5. Remove two flat tip screws (Figure 1, Item 4) securing wires (Figure 1, Item 3) to low oil pressure cut-off switch (Figure 1, Item 5). Mark and disconnect wires (Figure 1, Item 3).

NOTE

Use a second wrench to keep mounting elbow from turning.

Be cautious of items surrounding low oil pressure cut-off switch (Figure 1, Item 5).

REMOVAL – Continued

6. Remove low oil pressure cut-off switch (Figure 1, Item 5) from engine.

END OF TASK

REPLACEMENT

1. Clean off old anti-seize compound from all threaded areas.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

NOTE

Do not get anti-seize compound on end of low oil pressure cut-off switch (Figure 1, Item 5).

2. Apply anti-seize compound to threads of low oil pressure cut-off switch (Figure 1, Item 5).

CAUTION

When the following step is being performed, do not force low oil pressure cut-off switch (Figure 1, Item 5) or cross thread. Failure to observe this caution can result in damage to the engine.

NOTE

When performing the following step, use a second wrench to keep mounting elbow from turning.

3. Install low oil pressure cut-off switch (Figure 1, Item 5) onto mounting elbow and tighten.

NOTE

Prior to performing the following step, inspect wires (Figure 1, Item 3) and terminal for connectivity. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire.

4. Install wires (Figure 1, Item 3) onto low oil pressure cut-off switch (Figure 1, Item 5) and secure with flat tip screws (Figure 1, Item 4).

5. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

6. Install access panel (Figure 1, Item 2).

7. Install cargo restraints (not shown).

8. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

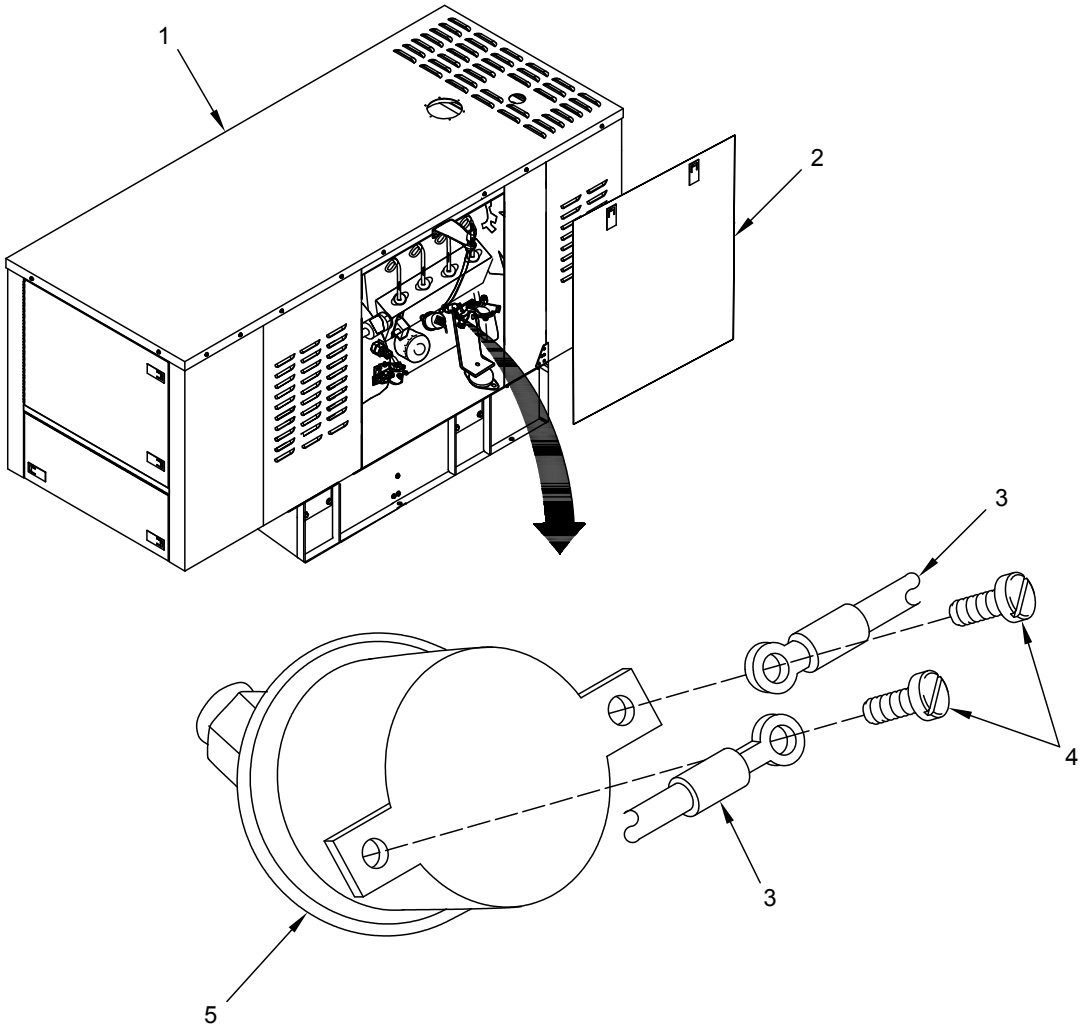

Figure 1. Low Oil Pressure Cut-Off Switch Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET ELECTRIC FUEL PUMP

GENERAL

This work package provides information on the services and removal/replacement of the Genset electric fuel pump. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

ELECTRIC FUEL PUMP REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety Glasses

Materials/Parts
Electric fuel pump
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

REMOVAL

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 1, Item 2).

3. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

The electric fuel pump (Figure 1, Item 4) is located above the oil filter.

4. Disconnect electrical pig tail (Figure 1, Item 11) from wiring harness.

5. Remove and retain nut (Figure 1, Item 12) from electric fuel pump mounting bracket (Figure 1, Item 14) and mounting plate (Figure 1, Item 15).

6. Disconnect electric fuel pump ground wire (Figure 1, Item 13).

REMOVAL – Continued

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

7. Loosen two clamps (Figure 1, Item 5) and disconnect input and output fuel lines (Figure 1, Items 6 and 10).
8. Remove and retain two bolts (Figure 1, Item 9), flat washers (Figure 1, Item 8), and rubber grommets (Figure 1, Item 7).
9. If necessary, remove bolt (Figure 1, Item 3) to remove fuel pump mounting bracket (Figure 1, Item 14). Discard if damaged.
10. Properly dispose of electric fuel pump (Figure 1, Item 4).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps, inspect grommets (Figure 1, Item 7) and fuel lines (Figure 1, Items 6 and 10) for cracks, dryness, or other visible signs of wear or damage. If grommets (Figure 1, Item 7) or fuel lines (Figure 1, Items 6 and 10) appear excessively worn or are damaged, do not use.

Prior to performing the following steps, inspect electrical pig tail (Figure 1, Item 11), ground wire (Figure 1, Item 13) and terminals for connectivity. Ensure that wire has not become brittle and that there are no nicks, cuts, or other damage to wire. Ensure that electrical connectors are free and clear of grease, dirt or other contaminates that may impede electrical connectivity.

1. If removed, install fuel pump mounting bracket (Figure 1, Item 14) and secure with bolt (Figure 1, Item 3).
2. Mount two rubber grommets (Figure 1, Item 7) onto electric fuel pump (Figure 1, Item 4).
3. Secure electric fuel pump (Figure 1, Item 4) to electric fuel pump mounting bracket (Figure 1, Item 14) and mounting plate (Figure 1, Item 15) using two bolts (Figure 1, Item 9) and flat washers (Figure 1, Item 8).
4. Connect electric fuel pump ground wire (Figure 1, Item 13) to electric fuel pump mounting bracket (Figure 1, Item 14) and mounting plate (Figure 1, Item 15) and secure using nut (Figure 1, Item 12).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

5. Connect input and output fuel lines (Figure 1, Items 6 and 10) and tighten clamps (Figure 1, Item 5).
6. Connect electrical pig tail (Figure 1, Item 1`) on electric fuel pump (Figure 1, Item 4) to wiring harness.

REPLACEMENT - Continued

7. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
8. Install rear access panel (Figure 1, Item 2).
9. Install cargo restraints (not shown).
10. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

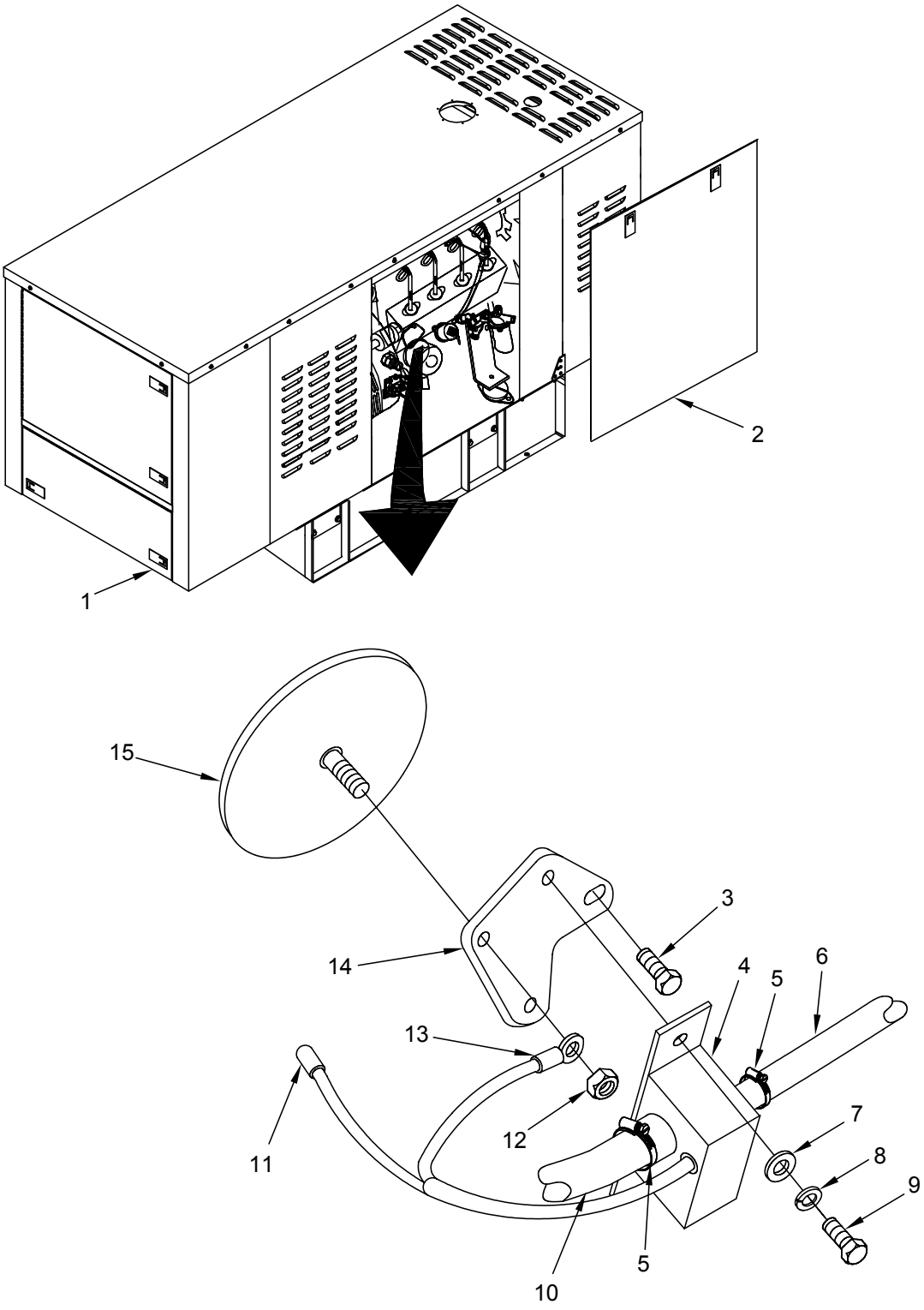

Figure 1. Electric Fuel Pump Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET FUEL INJECTION SYSTEM

GENERAL

This work package provides information on the services and removal/replacement of the Genset electric fuel pump. It consists of:

- Fuel injector removal/clean/replacement
- Fuel injector pump removal/replacement
- Fuel line removal/replacement
- Prime fuel system

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

FUEL INJECTOR REMOVAL/CLEAN/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Fuel injector
Cloth, cleaning (WP 0168, Item 14)
Brush, soft cleaning (WP 0168, Item 10)

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

REMOVAL

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel.
3. Remove front and rear access panels.
4. Disconnect battery ground cable (black) from battery ground terminal (f necessary, refer to procedure in (WP 0041) of this TM).

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

It is not necessary to disconnect the fuel line from the fuel injector rail to remove fuel injectors.

It is necessary to rotate oil dipstick mount 180 degrees to gain access to fuel system on 2nd cylinder.

5. For 2nd cylinder fuel system access, remove two mounting bolts (Figure 1, Item 2) and two lock washers (Figure 1, Item 3) from oil dipstick mount (Figure 1, Item 1) and rotate mount (Figure 1, Item 1) 180 degrees. Otherwise proceed to step 6.

REMOVAL – Continued

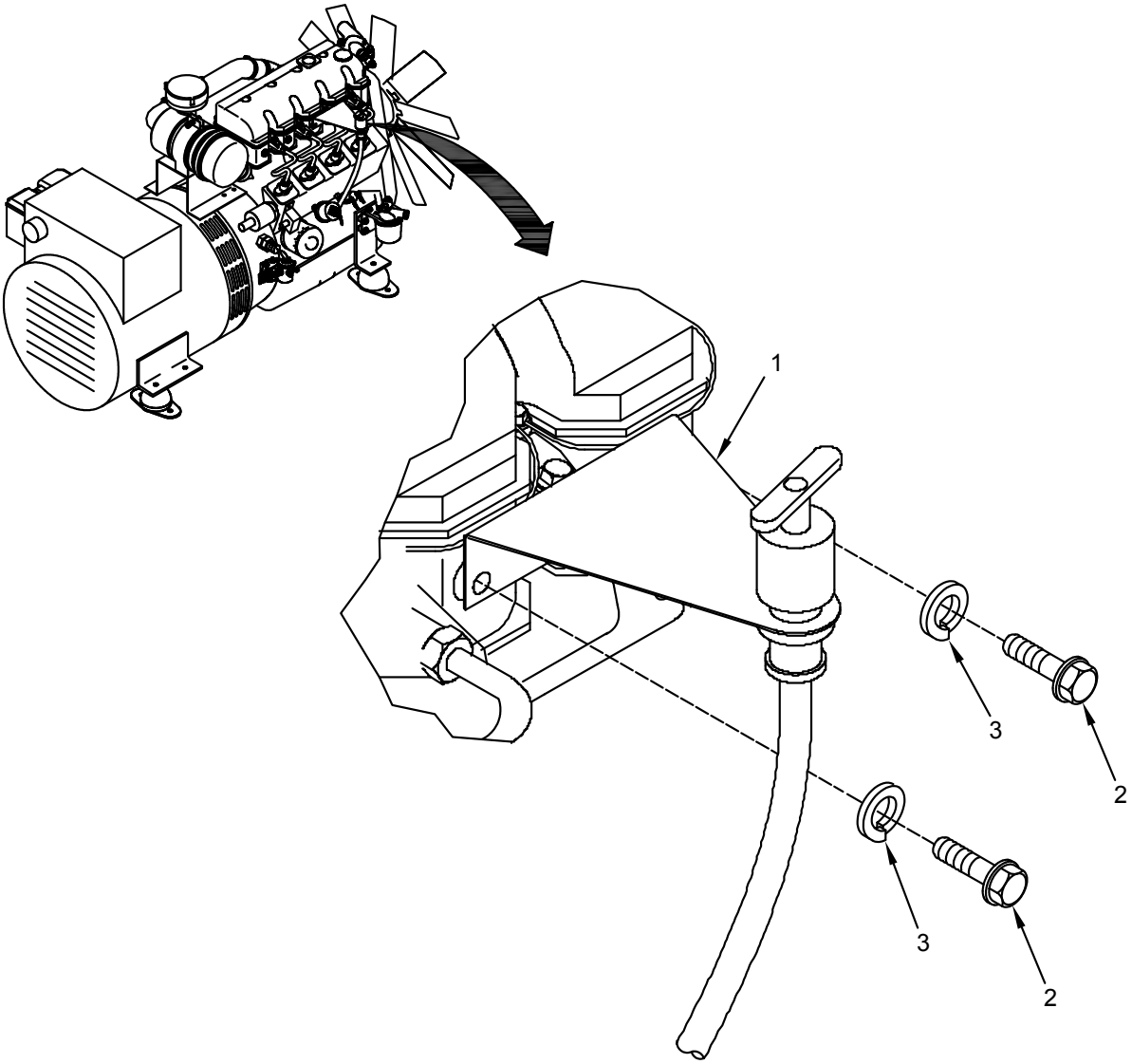

Figure 1. Oil Dipstick Mount.

CAUTION

Each bolt has a hole to allow fuel to pass through into the injector. When removing bolts, place in a clean, dry area to prevent dirt and debris from clogging holes.

NOTE

It is not necessary to disconnect fuel line from fuel injector rail to remove fuel injectors. Only disconnect fuel line if replacing rail.

6. Remove four bolts (Figure 2, Item 1) from fuel rail (Figure 2, Item 9).

7. Lift fuel rail (Figure 2, Item 9) away from fuel injectors (Figure 2, Item 8) and set on top of valve cover.

8. Ensure that brass seals (Figure 2, Item 2) from fuel injector rail (Figure 2, Item 9) remain secured to rail.

REMOVAL – Continued

CAUTION

When disassembling fuel system take care not to mix parts. Keep each cylinders injector, fuel line, and bolts separate and reattach to appropriate cylinder when reassembling.

9. Disconnect injector fuel line (Figure 2, Item 5) from corresponding injector pump (Figure 3, Item 5).
10. Disconnect injector fuel line (Figure 2, Item 5) from fuel injector (Figure 2, Item 8).
11. Remove injector fuel line (Figure 2, Item 5) and set aside.
12. Remove bolt (Figure 2, Item 3) from fuel injector hold down (Figure 2, Item 4) and set aside.
13. Remove fuel injector hold down (Figure 2, Item 4) and set aside.
14. Using a flat tip screw driver, pry up on fuel injector (Figure 2, Item 8) to remove from engine block.

END OF TASK

CLEAN

1. Wipe excess fuel from fuel injector.
2. Remove any loose carbon build up on tip of fuel injector (Figure 2, Item 7) with lint free cleaning cloth.
3. Using a soft cleaning brush and solvent, clean carbon buildup from tip of fuel injector (Figure 2, Item 7).
4. Allow fuel injector to dry completely before reassembly.

END OF TASK

REPLACEMENT

1. Ensure fuel injector O-ring (Figure 2, Item 6) is in proper position and serviceable.
2. Press fuel injector (Figure 2, Item 8) into position until seated.
3. Install fuel injector hold down (Figure 2, Item 4) and bolt (Figure 2, Item 3).
4. Using torque wrench, tighten bolts (Figure 2, Item 3) on fuel injector hold down (Figure 2, Item 4) to 23~30 ft./lb (31~41 n-m/3.2~4.2 kgf-m).
5. Align fuel rail (Figure 2, Item 9) with fuel injectors (Figure 2, Item 8).
6. Insert four bolts (Figure 2, Item 1) through fuel rail (Figure 2, Item 9) and brass seals (Figure 2, Item 2) into fuel injector heads.
7. Using torque wrench, tighten fuel rail bolts (Figure 2, Item 1) to 7 to 10 ft./lb (10~14 n-m/1.0~1.4 kgf-m).
8. Place injector fuel line (Figure 2, Item 5) into position.
9. Finger tighten fuel line (Figure 2, Item 5) to corresponding injector pump (Figure 3, Item 5).
10. Finger tighten fuel line (Figure 2, Item 5) to corresponding fuel injector (Figure 2, Item 8).

REPLACEMENT – Continued

11. Tighten fuel line connectors. Using torque wrench, tighten fuel lines to 11 to 18 ft./lb (19~28 n-m/ 1.9~2.9 kgf-m).

12. If necessary, reattach oil dipstick mount (Figure 1, Item 1) using two mounting bolts (Figure 1, Item 2) and two lock washers (Figure 1, Item 3). Tighten down mounting bolts (Figure 1, Item 2).

13. Reconnect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

14. Install front and rear access panels and cargo restraints.

15. Start Genset in accordance with Genset Power Up Procedure (WP 0005).

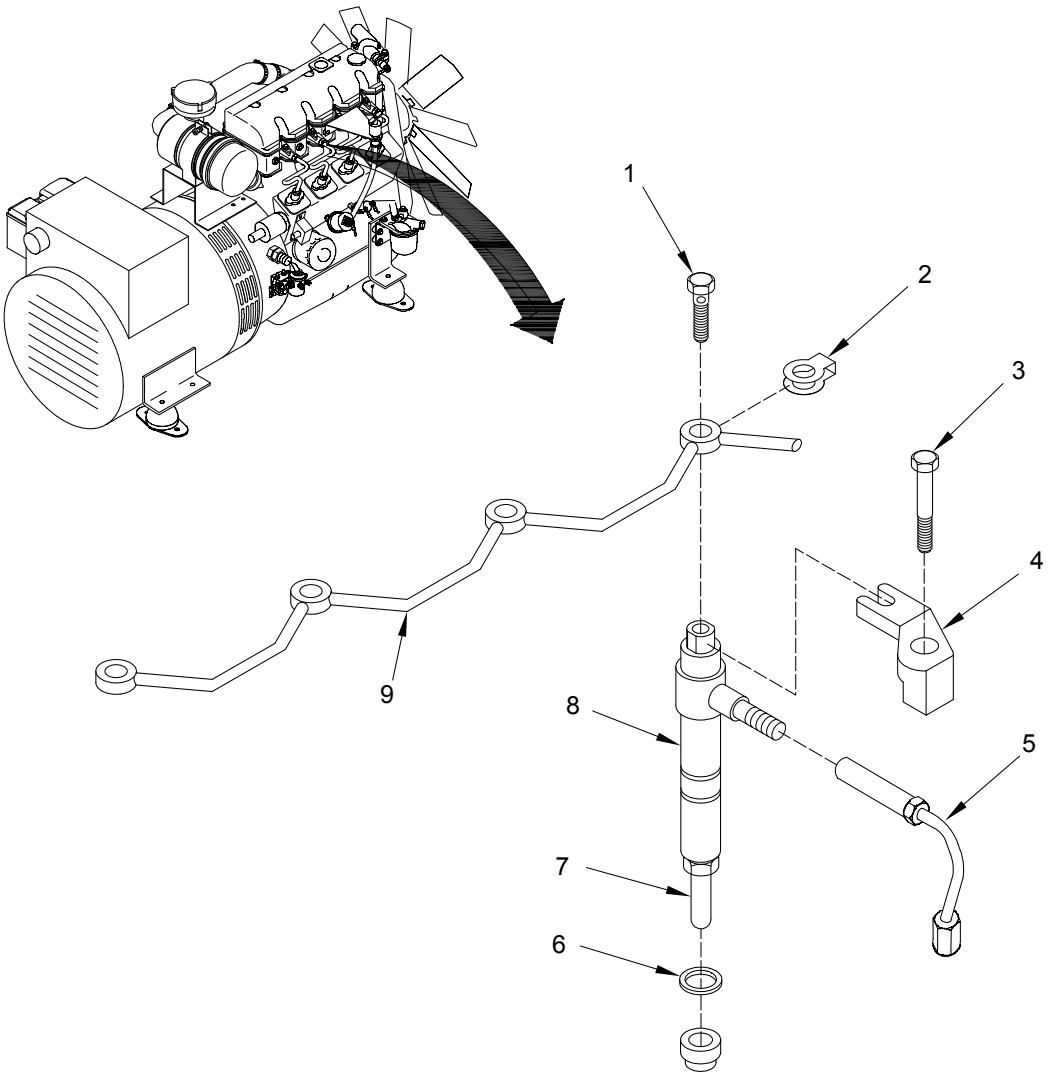

Figure 2. Fuel Injector Removal/Replacement.

END OF TASK

FUEL INJECTOR PUMP REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glassses

Materials/Parts
Fuel injector pump with seal
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH – OFF

REMOVAL

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel.
3. Remove front and rear access panels.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

It is not necessary to disconnect the fuel line from the fuel injector pump rail to remove fuel injector pumps.

It is necessary to rotate oil dipstick mount 180 degrees to gain access to fuel system on 2nd cylinder.

5. For 2nd cylinder fuel system access, remove two mounting bolts (Figure 1, Item 2) and two lock washers (Figure 1, Item 3) from oil dipstick mount (Figure 1, Item 1) and rotate mount (Figure 1, Item 1) 180 degrees. Otherwise proceed to step 6.

REMOVAL – Continued

6. Remove four bolts (Figure 3, Item 1) from fuel injector pump fuel rail (Figure 3, Item 11).

7. Remove four brass seals (Figure 3, Item 2) from top of fuel injector pump fuel rail (Figure 3, Item 11).

CAUTION

When disassembling fuel system take care not to mix parts. Keep each cylinders injector, pump, fuel line, bolts, and seals separate and reattach to appropriate cylinder when reassembling.

8. Lift fuel rail (Figure 3, Item 11) away from fuel injector pumps (Figure 3, Item 5).

9. Remove 4 brass seals (Figure 3, Item 10) from bottom of fuel injector pump fuel rail (Figure 3 Item 11).

10. Disconnect fuel line (Figure 3, Item 3) from corresponding injector pump (Figure 3, Item 5).

11. Disconnect fuel line (Figure 3, Item 3) from fuel injector (Figure 2, Item 8).

12. Remove injector fuel line (Figure 3, Item 3) and set aside.

13. Remove two mounting bolts (Figure 3, Item 9) from fuel injector pump (Figure 3, Item 5).

14. Remove two mounting nuts (Figure 3, Item 4) from fuel injector pump mounting studs (Figure 3, Item 7).

15. Remove fuel injector pump (Figure 3, Item 5) and set aside. Remove old fuel injector pump seal (Figure 3, Item 6) and discard.

END OF TASK

REPLACEMENT

1. Place new fuel injector pump seal (Figure 3, Item 6) on engine block. Seat seal over mounting studs (Figure 3, Item 7) to position.

2. Check alignment of actuator slide to ensure it will seat into actuator rail (Figure 3, Item 8) inside engine block.

3. Slide fuel injector pump (Figure 3, Item 5) into position on mounting studs (Figure 3, Item 7).

4 Install two bolts (Figure 3, Item 9) into injector pump (Figure 3, Item 5).

5. Install two nuts (Figure 3, Item 4) onto injector pump mounting studs (Figure 3, Item 7).

6. Using torque wrench, tighten bolts (Figure 3, Item 9) and nuts (Figure 3, Item 4) to 11~18 ft./lb (19~28 n-m/ 1.9~2.9 kgf-m).

7. Align fuel rail (Figure 3, Item 11) with fuel injector pumps (Figure 3, Item 5).

8. Place original brass seals (Figure 3, Item 10) between fuel rail (Figure 3, Item 11) and pump (Figure 3, Item 5).

9. Insert four fuel rail bolts (Figure 3, Item 1) through top brass seals (Figure 3, Item 2), fuel rail (Figure 3, Item 11), and bottom brass seal (Figure 3, Item 10) and into fuel injector pump (Figure 3, Item 5).

10. Using torque wrench, tighten fuel rail bolts (Figure 3, Item 1) to 15~18 ft/lbs (20~25 n-m/ 2.0~2.5 kgf-m).

REPLACEMENT – Continued

11. Place injector pump fuel line (Figure 3, Item 3) into position.
12. Finger tighten fuel line (Figure 3, Item 3) to corresponding injector pump (Figure 3, Item 5).
13. Finger tighten fuel line (Figure 3, Item 3) to corresponding fuel injector (Figure 2, Item 8).
14. Using torque wrench, tighten fuel line connectors fuel to 11~18 ft lbs. (19~28 n-m/1.9~2.8 kgf-m).
15. If necessary, reattach oil dipstick mount (Figure 1, Item 1) using two mounting bolts (Figure 1, Item 2) and two lock washers (Figure 1, Item 3). Tighten down mounting bolts (Figure 1, Item 2).
16. Reconnect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
17. Install front and rear access panels and install cargo restraints.
18. Start Genset in accordance with Genset Power Up Procedure (WP 0005).

REPLACEMENT – Continued

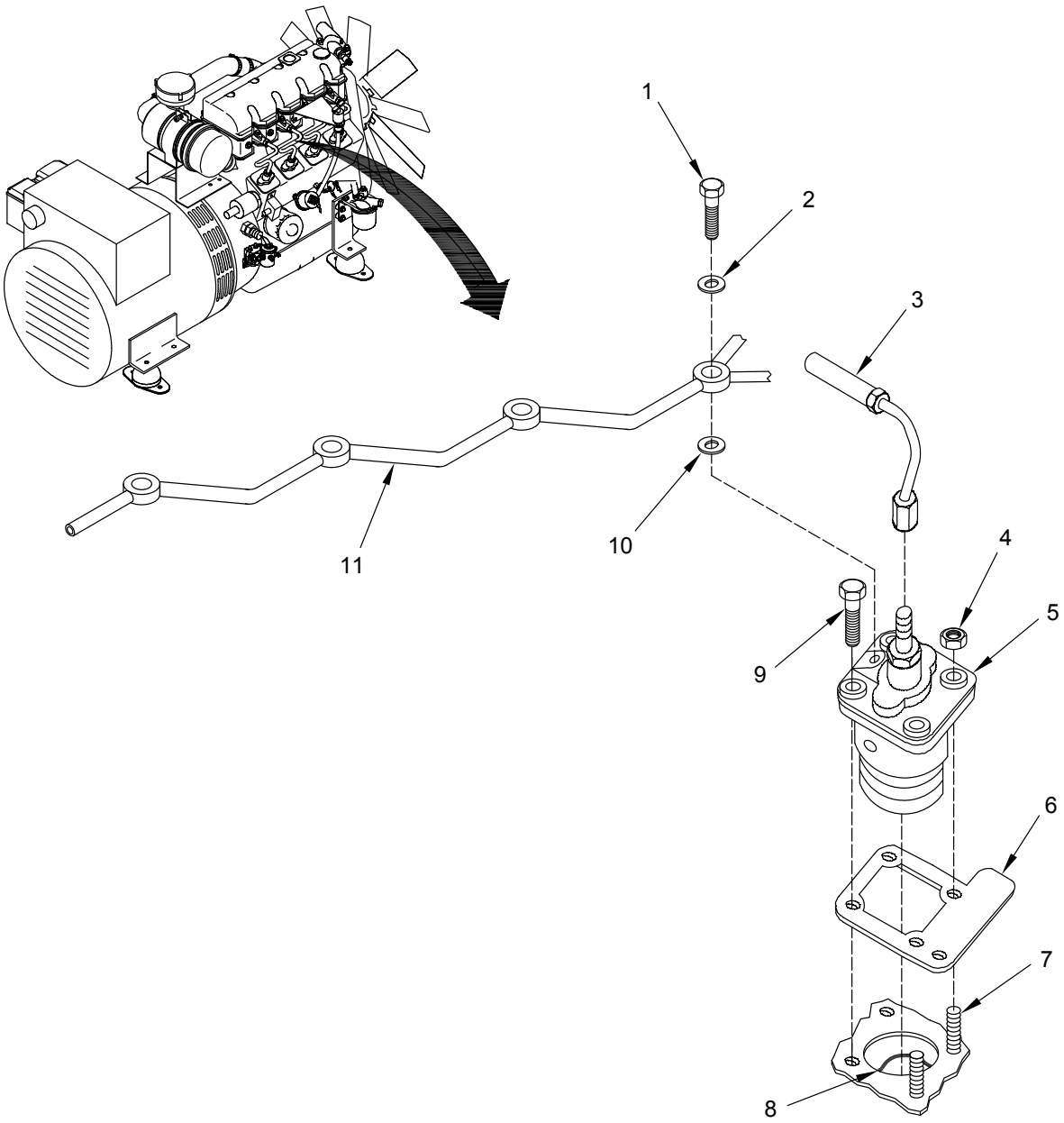

Figure 3. Fuel Injector Pump Removal/Replacement.

END OF TASK

FUEL INJECTION SYSTEM LINES REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Fuel line
Drain pan
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

REMOVAL (Fuel Injector Fuel Line)

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints to gain access to rear access panel.
3. Remove front and rear access panels.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

It is necessary to rotate oil dipstick mount 180 degrees to gain access to fuel system on 2nd cylinder.

5. For 2nd cylinder fuel system access, remove two mounting bolts (Figure 1, Item 2) and two lock washers (Figure 1, Item 3) from oil dipstick mount (Figure 1, Item 1) and rotate mount (Figure 1, Item 1) 180 degrees. Otherwise proceed to step 6.
6. Disconnect fuel injector line (Figure 4, Item 7) from fuel injector (Figure 4, Item 5).

REMOVAL (Fuel Injector Fuel Line) – Continued

7. Disconnect fuel injector line (Figure 4, Item 7) from corresponding fuel injector pump (Figure 4, Item 8).

END OF TASK

REPLACEMENT (Fuel Injector Fuel Line)

CAUTION

When assembling fuel system take care not to mix parts. Keep each cylinders injector, pump, fuel line, bolts, and seals separate and reattach to appropriate cylinder.

1. Place fuel injector line (Figure 4, Item 7) into position.
2. Finger tighten fuel injector line (Figure 4, Item 7) to corresponding fuel injector pump (Figure 4, Item 8).
3. Finger tighten fuel injector line (Figure 4, Item 7) to corresponding fuel injector (Figure 4, Item 5).
4. Using torque wrench, tighten fuel line connectors to 11~18 ft./lb (19~28 n-m/1.9~2.9 kgf-m).
5. If necessary, reattach oil dipstick mount (Figure 1, Item 1) using two mounting bolts (Figure 1, Item 2) and two lock washers (Figure 1, Item 3). Tighten down mounting bolts (Figure 1, Item 2).
6. Reconnect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
7. Install front and rear access panels and install cargo restraints.
8. Start Genset as described in Genset Power Up Procedure (WP 0005).

END OF TASK

REMOVAL (Fuel Injector Rail)

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints to gain access to rear access panel.
3. Remove front and rear access panels.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

CAUTION

When disassembling fuel system take care not to mix parts. Keep each cylinders injector, pump, fuel line, bolts, and seals separate and reattach to appropriate cylinder when reassembling.

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

5. Disconnect rubber fuel hose (Figure 4, Item 6) from fuel injector rail (Figure 4, Item 1).

REMOVAL (Fuel Injector Rail) – Continued

CAUTION

Each bolt has a hole to allow fuel to pass through into the injector. When removing bolts, place in a clean, dry area to prevent dirt and debris from clogging holes.

6. Remove four bolts (Figure 4, Item 2) from fuel injector rail (Figure 4, Item 1).

7. Lift fuel injector rail (Figure 4, Item 1) and brass seals (Figure 4, Item 3) away from fuel injector heads (Figure 4, Item 4).

END OF TASK

REPLACEMENT (Fuel Injector Rail)

CAUTION

When assembling fuel system take care not to mix parts. Keep each cylinders injector, pump, fuel line, bolts, and seals separate and reattach to appropriate cylinder.

1. Align fuel injector rail (Figure 4, Item 1) with fuel injector heads (Figure 4, Item 4).

2. Insert four bolts (Figure 4, Item 2) through fuel injector rail (Figure 4, Item 1) and brass seals (Figure 4, Item 3) into fuel injector heads (Figure 4, Item 4).

3. Using torque wrench, tighten fuel injector rail bolts (Figure 4, Item 2) to 7~10 ft./lb (10~14 n-m/1.0~1.4 kgf-m)

4. Connect rubber fuel hose (Figure 4, Item 6) to fuel injector rail (Figure 4, Item 1).

5. Reconnect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

6. Install front and rear access panels and install cargo restraints.

7. Start Genset as described in Genset Power Up Procedure (WP 0005).

END OF TASK

REMOVAL (Fuel Injector Pump Fuel Rail)

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel.

3. Remove front and rear access panels.

4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

CAUTION

When disassembling fuel system take care not to mix parts. Keep each cylinders injector, pump, fuel line, bolts, and seals separate and reattach to appropriate cylinder when reassembling.

REMOVAL (Fuel Injector Pump Fuel Rail) – Continued

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

5. Disconnect fuel source hose (Figure 4, Item 12) from fuel injector pump fuel rail (Figure 4, Item 11).
6. Disconnect rubber hose (Figure 4, Item 6) from fuel injector pump fuel rail (Figure 4, Item 11).
7. Disconnect fuel return hose (Figure 4, Item 9) from fuel injector pump fuel rail (Figure 4, Item 11).
8. Remove four bolts (Figure 4, Item 14) from fuel injector pump fuel rail (Figure 4, Item 11).
9. Remove four brass seals (Figure 4, Item 13) from top of fuel injector pump fuel rail (Figure 4, Item 11).
10. Lift fuel injector pump fuel rail (Figure 4, Item 11) away from fuel injector pumps (Figure 4, Item 8).
11. Remove four brass seals (Figure 4, Item 10) from bottom of fuel injector pump fuel rail (Figure 4, Item 11).

END OF TASK

REPLACEMENT (Fuel Injector Pump Fuel Rail)

CAUTION

When assembling fuel system take care not to mix parts. Keep each cylinders injector, pump, fuel line, bolts, and seals separate and reattach to appropriate cylinder.

1. Align fuel injector pump fuel rail (Figure 4, Item 11) with fuel injector pumps (Figure 4, Item 8).
2. Place four brass seals (Figure 4, Item 10) between fuel injector pump fuel rail (Figure 4, Item 11) and fuel injector pumps (Figure 4, Item 8).
3. Place four brass seals (Figure 4, Item 13) on top of fuel injector pump fuel rail (Figure 4, Item 11) and insert four bolts (Figure 4, Item 14).
4. Using torque wrench, tighten fuel rail bolts (Figure 4, Item 14) to 15~18 ft./lb (20~25 n-m/2.0~2.5 kgf-m)
5. Attach fuel return hose (Figure 4, Item 9) to fuel injector pump fuel rail (Figure 4, Item 11).
6. Attach rubber hose (Figure 4, Item 6) to fuel injector pump fuel rail (Figure 4, Item 11).
7. Attach fuel source hose (Figure 4, Item 12) to fuel injector pump fuel rail (Figure 4, Item 11).
8. Reconnect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
9. Install front and rear access panels and install cargo restraints.
10. Start Genset as described in Genset Power Up Procedure (WP 0005).

END OF TASK

REMOVAL (Rubber Fuel Supply Hose)

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel.
3. Remove front and rear access panels.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

5. Disconnect rubber hose (Figure 4, Item 6) from fuel injector fuel rail (Figure 4, Item 1).
6. Disconnect rubber hose (Figure 4, Item 6) from fuel injector pump fuel rail (Figure 4, Item 11).

END OF TASK

REPLACEMENT (Rubber Fuel Supply Hose)

1. Attach rubber hose (Figure 4, Item 6) to fuel injector fuel rail (Figure 4, Item 1).
2. Attach rubber hose (Figure 4, Item 6) to fuel injector pump fuel rail (Figure 4, Item 11).
3. Reconnect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
4. Install front and rear access panels and install cargo restraints.
5. Start Genset as described in Genset Power Up Procedure (WP 0005).

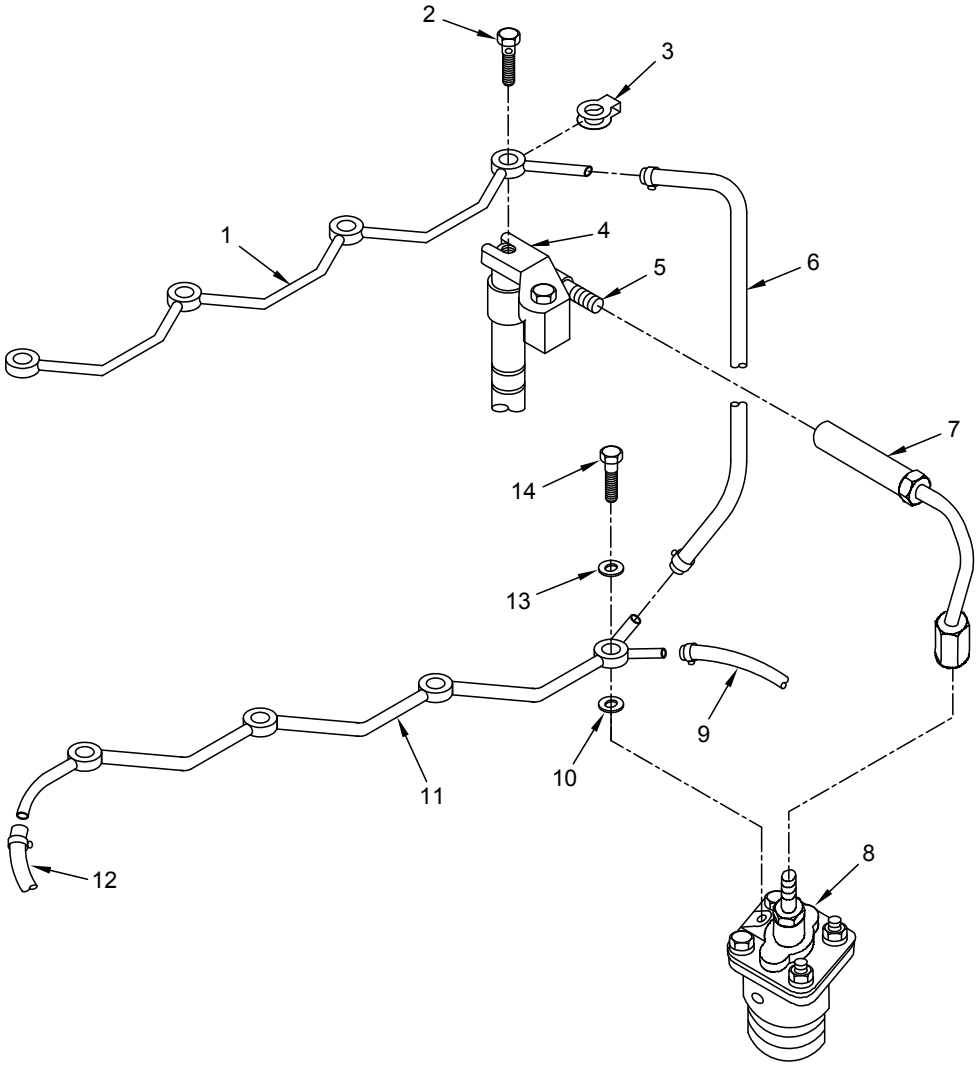

Figure 4. Fuel Injection System Lines Removal/Replacement.

END OF TASK

PRIME FUEL SYSTEM

INITIAL SETUP:

Personnel Required
One

References
WP 0004, WP 0005

Equipment Condition
Trailer parked in operational position
Wheels choked
Hand brakes engaged

NOTE

To prime fuel system using auxiliary fuel source, refer to (WP 0005) Fueling Genset from Auxiliary Fuel Source.

PRIME FUEL SYSTEM USING FUEL PUMP

1. Open fuel level access panel and check fuel level, fill if required (if necessary, refer to (WP 0004) of this TM for location and identification of controls and indicators).
2 Close fuel level access panel.
3. Open rear engine access panel.
4. Open engine control panel.
5. Turn engine start switch to run position, engine fuel pump will run.
6. Allow engine fuel pump to run for 15 to 30 seconds or until fuel pump becomes noticeable quieter (this signifies fuel is moving through fuel pump).
7. Start Genset as per (WP 0005), Genset Power Up Procedure.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET GLOW PLUG AND GLOW PLUG CONNECTOR

GENERAL

This work package provides information on the inspection, removal and replacement of the Genset glow plugs and connector strip. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from heat and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

GLOW PLUG AND CONNECTOR STRIP REMOVAL/INSPECT/TEST/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)
Multimeter (WP 0165, Item 2)

Materials/Parts
Glow Plug
Connector strip
Anti-seize compound (WP 0168, Item 3)
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

References
WP 0005
WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 1, Item 3) of Genset.
3. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

Steps 4 and 5 allow easier access to the glow plugs.

4. Loosen but do not remove nut and bolt that secures exhaust pipe cap (not shown). Remove exhaust pipe cap and set aside.
5. Remove and retain 20 bolts, lock washers, and flat washers (not shown) that secures top access panel (Figure 1, Item 2) to Genset (Figure 1, Item 1). Remove top access panel (Figure 1, Item 2) and set aside.

REMOVAL - Continued

NOTE

The dip-stick bracket may need to be removed to allow access to glow plug #2.

6. Remove and retain four nuts (Figure 1, Item 5) and washers (Figure 1, Item 6) that secure glow plug connector (Figure 1, Item 8) and terminal lug (Figure 1, Item 7) to glow plugs (Figure 1, Items 4, 9 through 11).

7. Disconnect terminal lug (Figure 1, Item 7) from glow plug #1 (Figure 1, Item 4) and set aside.

8. Remove connector strip (Figure 1, Item 8) from glow plugs (Figure 1, Items 4, 9 through 11) and set aside.

NOTE

If glow plugs are to be re-used, identify location and mark glow plug so it may be returned to same spot.

9. Remove four glow plugs (Figure 1, Items 4, 9 through 11).

END OF TASK

INSPECT

1. Inspect glow plugs for slagging or melting. If either condition is present discard glow plug and replace.

2. Inspect glow plugs for excessive soot. If condition is present, clean glow plug and test.

END OF TASK

TEST

To measure resistance of glow plug:
a) Set multimeter to read resistance (X1 scale).
b) Touch outside threaded ring of the glow plug with black meter lead.
c) Touch threaded glow plug connector strip stud with red meter lead.

If multimeter reads less than 3Ω or greater then 4Ω replace the glow plug.

END OF TASK

REPLACEMENT

1. Clean off old sealant from all threaded areas.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from heat and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

NOTE

Do not get anti-seize compound on ends of glow plugs.

2. Apply anti-seize compound to threads of glow plugs (Figure 1, Items 4, 9 through 11).

CAUTION

When the following step is being performed, glow plugs (Figure 1, Items 4, 9 through 11) should screw in without resistance. Do not force glow plugs (Figure 1, Items 4, 9 through 11) or cross thread. Failure to observe this caution can result in damage to the engine.

NOTE

If reusing glow plugs (Figure 1, Items 4, 9 through 11), insert glow plugs (Figure 1, Items 4, 9 through 11) back into the cylinder from which they were removed.

3. Install glow plugs (Figure 1, Items 4, 9 through 11) and tighten finger tight.

4. Using torque wrench, tighten glow plugs (Figure 1, Items 4, 9 through 11) to 11~14 ft./lb (15~20 n-m/1.5~2.0 kgf-m).

NOTE

Prior to performing the following step, inspect terminal lug (Figure 1, Item 7) and wire for connectivity. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire.

Prior to performing the following step, inspect glow plug connector (Figure 1, Item 8). Ensure that glow plug connector (Figure 1, Item 8) is in good working order and that no grease, dirt, paint, corrosion or other damage is present.

5. Install connector strip (Figure 1, Item 8). Connect terminal lug (Figure 1, Item 7) to glow plug #1 (Figure 1, Item 4).

6. Secure glow plug connector (Figure 1, Item 8) and terminal lug (Figure 1, Item 7) to glow plugs (Figure 1, Items 4, 9 through 11) using four nuts (Figure 1, Item 5) and washers (Figure 1, Item 6).

REPLACEMENT - Continued

NOTE

If the dip-stick bracket was removed to allow access to glow plug #2, re install at this time.

7. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
8. Install top access panel (Figure 1, Item 2) and secure to Genset using 20 bolts, lock washers, and flat washers (not shown).
9. Install exhaust pipe cap (not shown) and secure.
10. Install rear access panel (Figure 1, Items 3).
11. Install cargo restraints (not shown).
12. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

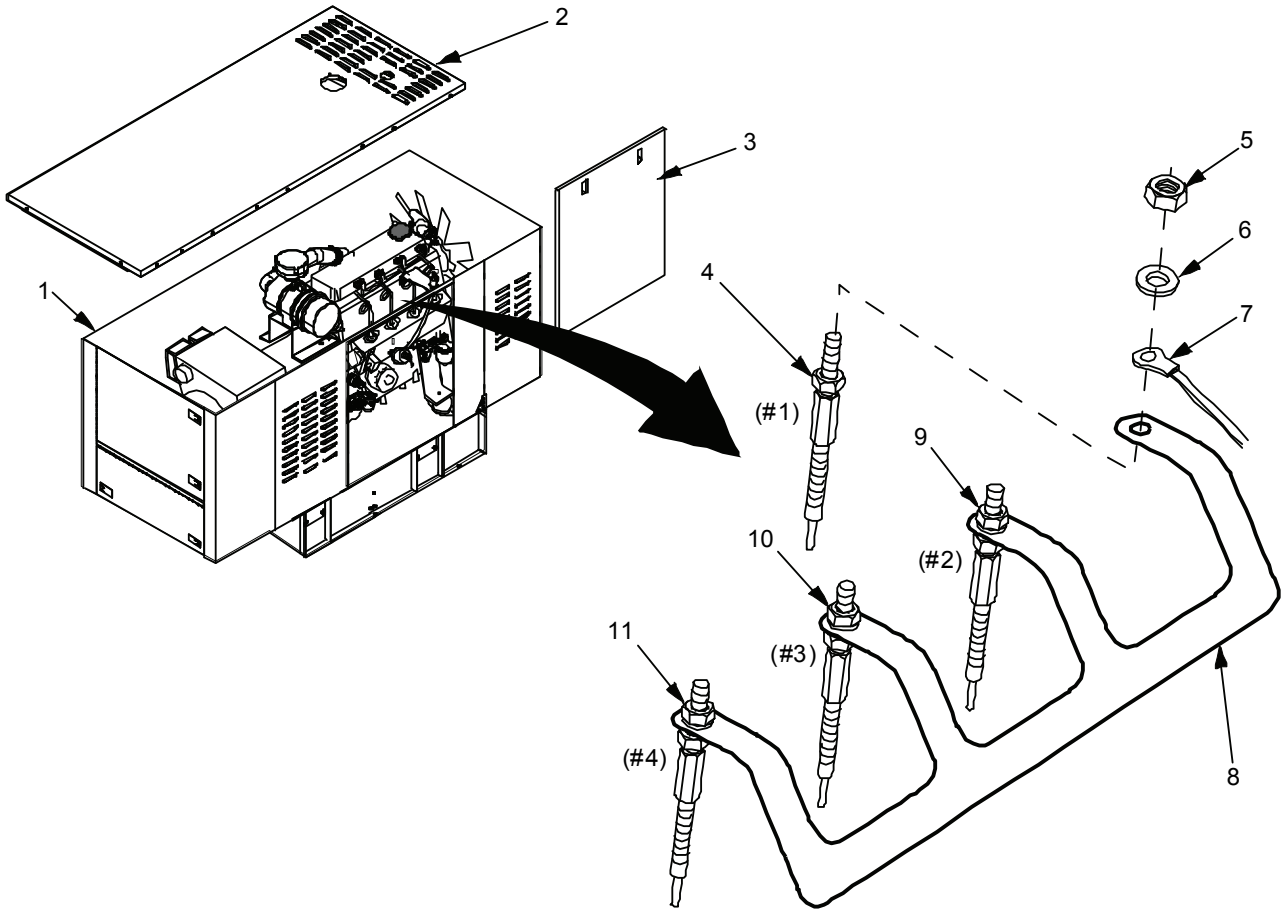

Figure 1. Glow Plug/Connector Strip Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET OIL PRESSURE SWITCH

GENERAL

This work package provides information on the removal/replacement of the Genset oil pressure switch.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

OIL PRESSURE SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Safety glasses

References
WP 0005, WP 0041
WP 0051, WP 0044

Materials/Parts
Oil pressure switch
Anti-seize compound (WP 0168, Item 3)

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

Personnel Required
One

REMOVAL

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 1, Item 2) of Genset.
3. Remove the rear access panel (Figure 1, Item 2) and set aside.

NOTE

The oil pressure switch (Figure 1, Item 3) is located between the oil pressure sending unit (WP 0051) and the fuel filter (WP 0044).

Prior to performing the following step, mark wires (Figure 1, Items 5) and terminals for connectivity.

4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
5. Remove and retain two screws (Figure 1, Item 4) and wires (Figure 1, Items 5) connected to oil pressure switch (Figure 1, Items 3).

NOTE

When performing the following step, be cautious of items surrounding oil pressure switch (Figure 1, Item 3).

REMOVAL – Continued

NOTE

When performing the following step, use a second wrench to keep mounting elbow from turning.

6. Remove oil pressure switch (Figure 1, Item 3) from engine.

END OF TASK

REPLACEMENT

1. Clean off old anti-seize compound from all threaded areas.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

NOTE

Do not get anti-seize compound on end of oil pressure switch (Figure 1, Item 3) or associated terminals.

2. Apply anti-seize compound to threads of oil pressure switch (Figure 1, Item 3).

CAUTION

When the following step is being performed, do not force oil pressure switch (Figure 1, Item 3) or cross thread. Failure to observe this caution can result in damage to the engine.

NOTE

When performing the following step, use a second wrench to keep mounting elbow from turning.

3. Install oil pressure switch (Figure 1, Item 3) onto mounting elbow and tighten.

NOTE

Prior to performing the following step, inspect wires (Figure 1, Item 5) and terminals for connectivity. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire.

4. Secure two wires (Figure 1, Item 5) to oil pressure switch (Figure 1, Item 3) with two screws (Figure 1, Item 4).

5. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

6. Install access panel (Figure 1, Item 2).

REPLACEMENT - Continued

7. Install cargo restraints (not shown).

8. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

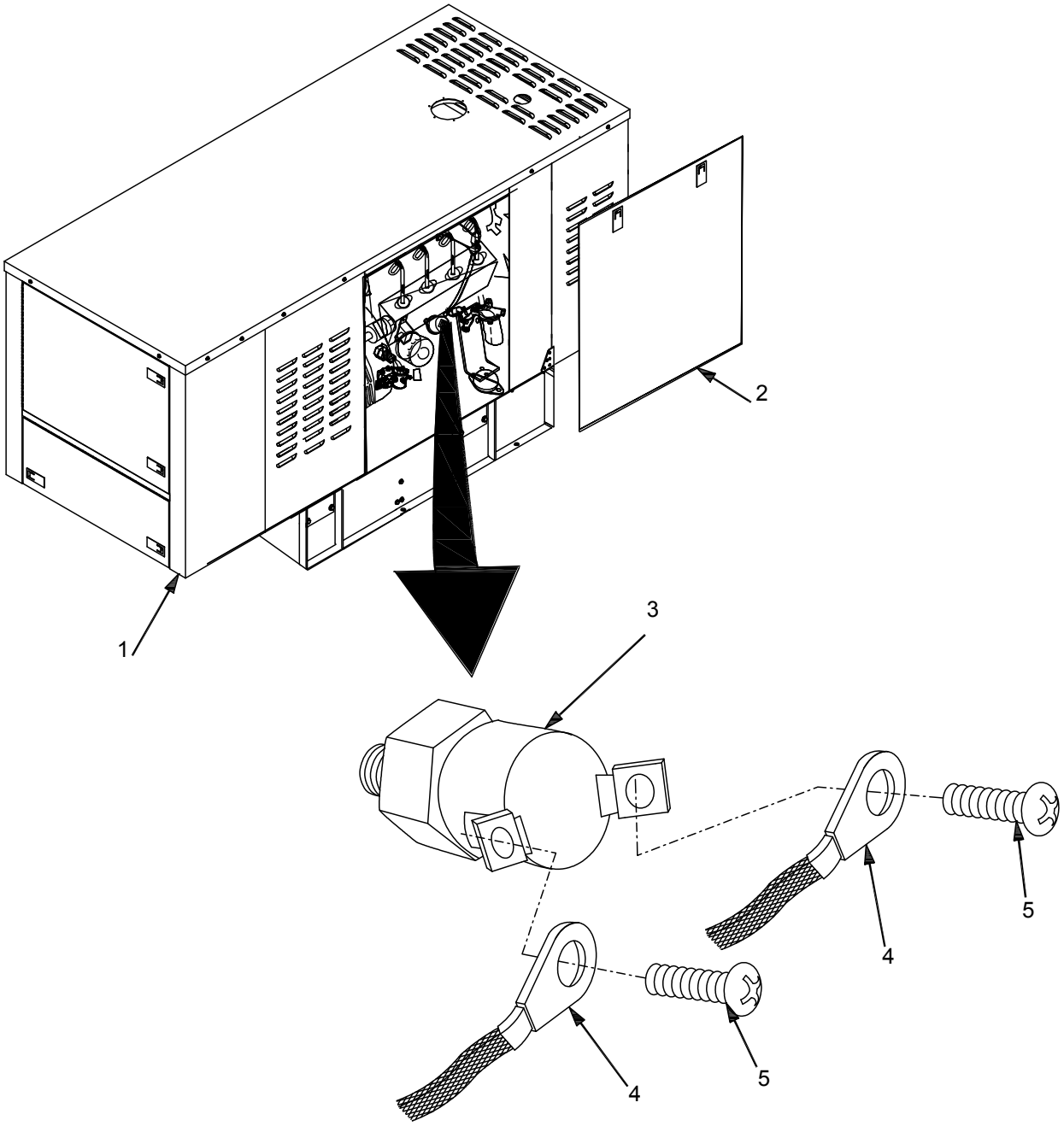

Figure 1. Oil Pressure Switch Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET OIL PRESSURE SENDING UNIT

GENERAL

This work package provides information on the removal and replacement of the Genset oil pressure sending unit.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

OIL PRESSURE SENDING UNIT REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety Glasses

References
WP 0005, WP 0041

Materials/Parts
Oil pressure sending unit
Anti-seize compound (WP 0168, Item 3)
Cloth, cleaning (WP 0168, Item 14)

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

Personnel Required
One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the access panel (Figure 1, Item 2) and set aside.

NOTE

The oil pressure sending unit (Figure 1, Item 7) is located next to the oil filter.

4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
5. Remove nut (Figure 1, Item 3), lock washer (Figure 1, Item 4) and flat washer (Figure 1, Item 5) securing wire (Figure 1, Item 6) to oil pressure sending unit (Figure 1, Item 7). Mark and disconnect wire (Figure 1, Item 6).

NOTE

Use a second wrench to keep mounting elbow from turning.

Be cautious of items surrounding oil pressure sending unit (Figure 1, Item 7).

REMOVAL – Continued

6. Remove oil pressure sending unit (Figure 1, Item 7) from engine.

END OF TASK

REPLACEMENT

1. Clean off old anti-seize compound from all threaded areas.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

NOTE

Do not get anti-seize compound on end of oil pressure sending unit (Figure 1, Item 7).

2. Apply anti-seize compound to threads of oil pressure sending unit (Figure 1, Item 7).

CAUTION

When the following step is being performed, do not force oil pressure sending unit (Figure 1, Item 7) or cross thread. Failure to observe this caution can result in damage to the engine.

NOTE

When performing the following step, use a second wrench to keep mounting elbow from turning.

3. Install oil pressure sending unit (Figure 1, Item 7) onto mounting elbow and tighten.

NOTE

Prior to performing the following step, inspect wire (Figure 1, Item 6) and terminal for connectivity. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire.

4. Install wire (Figure 1, Item 6) onto oil pressure sending unit (Figure 1, Item 7) and secure with nut (Figure 1, Item 3) lock washer (Figure 1, Item 4) and flat washer (Figure 1, Item 5).

5. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

6. Install access panel (Figure 1, Item 2).

7. Install cargo restraints (not shown).

8. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

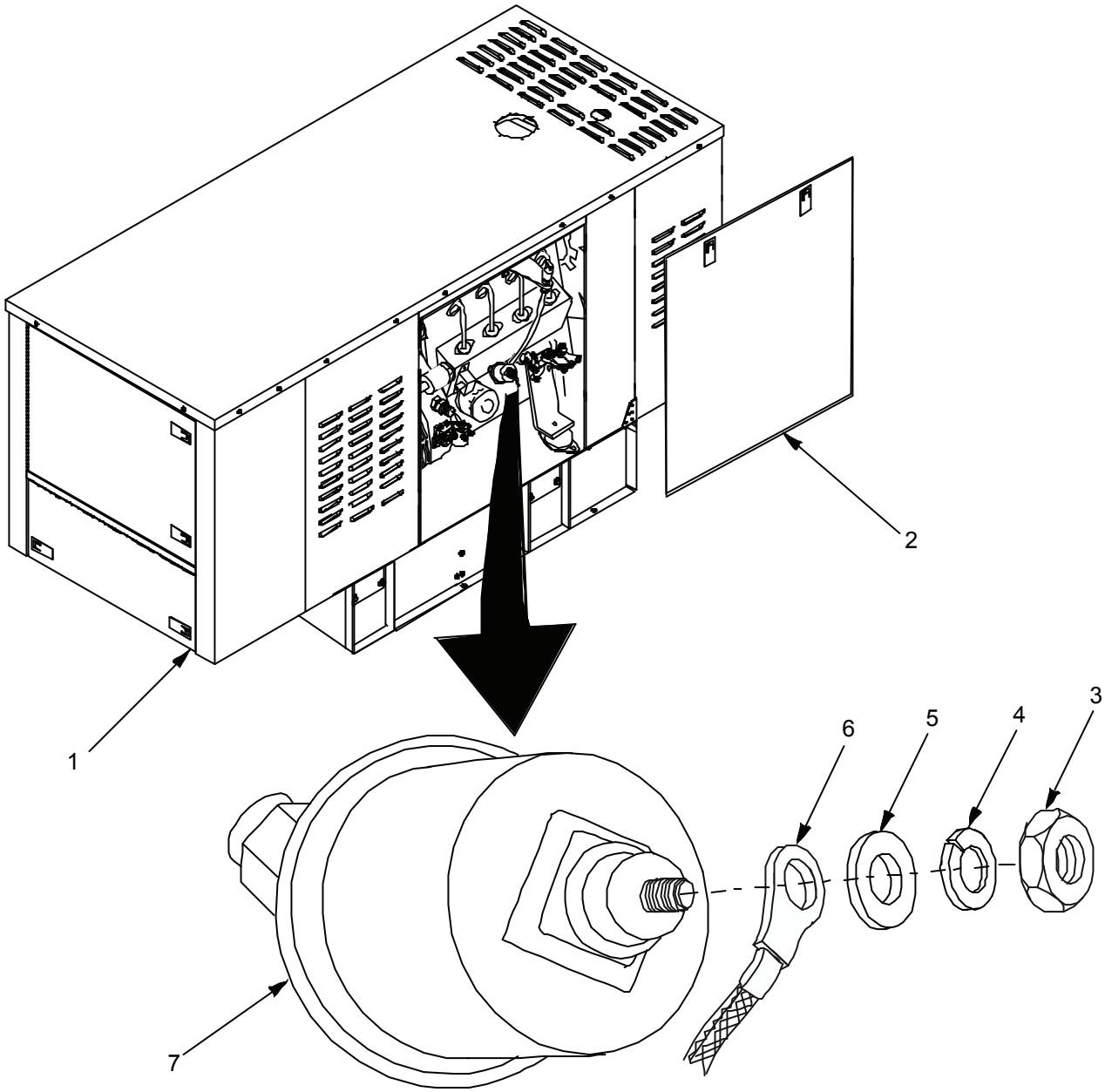

Figure 1. Oil Pressure Sending Unit Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET SOLENOID

GENERAL

This work package provides information on the removal and replacement of the Genset solenoids and associated circuit breaker. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

K2 OR K3 SOLENOID REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Solenoid

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

NOTE

The following procedure is applicable to the K2 and K3 solenoid assemblies associated with the TMSS-MED.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove rear access panel (not shown) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
5. Identify solenoid (Figure 1, Items 1 or 2) to be replaced.

NOTE

If markings on wire(s) and/or solenoid terminal(s) are missing, tag wire(s) and/or solenoid terminal(s) to help with identifying proper connections when replacing solenoid.

5. Remove and retain four nuts (Figure 1, Item 11) and lock washers (Figure 1, Item 10) that secure terminal lugs (Figure 1, Item 9) to solenoid terminals (Figure 1, Item 8).

REMOVAL – Continued

6. Disconnect terminal lugs (Figure 1, Item 9) from solenoid terminals (Figure 1, Item 8). Loosely install nuts (Figure 1, Item 11) and lock washers (Figure 1, Item 10) back onto solenoid terminals (Figure 1, Item 8).

7. Remove and retain two nuts (Figure 1, Item 3), bolts (Figure 1, Item 6), and four flat washers (Figure 1, Item 5) that secure solenoid (Figure 1, Items 1 or 2) to mounting bracket (Figure 1, Item 4).

8. Remove solenoid (Figure 1, Items 1 or 2) from mounting bracket (Figure 1, Item 4) on Genset and discard.

END OF TASK

REPLACEMENT

1 Secure solenoid (Figure 1, Items 1 or 2) to mounting bracket (Figure 1, Item 4) on Genset using two nuts (Figure 1, Item 3), bolts (Figure 1, Item 6), and four flat washers (Figure 1, Item 5).

NOTE

Prior to performing the following step, inspect terminal lugs (Figure 1, Item 8) and associated wiring. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire. Inspect solenoid terminals (Figure 1, Item 9) ensure that no damage or corrosion exists.

2. Connect terminal lugs (Figure 1, Item 9) to solenoid terminals (Figure 1, Item 8). Secure using four nuts (Figure 1, Item 11) and lock washers (Figure 1, Item 10). (See Table 1).

3 Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

4. Install access panel(s) (not shown) and cargo restraints (not shown).

5. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Electronic Connections for Genset Solenoids.

Solenoid/ location	# of wires	Wire Color	From		To
				Pin #	
Starter (K2) Near starter	One	Red	Power-in	1	Starter (Pin #1)
	Two	Green	Ground	2	Engine Ground Block
		Grey		2	Glow Plug Solenoid (K3) pin 2
	One	Grey	Trigger	3	Connector CF1 (Pin #4)
	One	Red	Power-out	4	Starter (Pin #2)
Glow Plug (K3) Under Starter					
	One	Grey	Power-in	1	Starter solenoid (K2) (Pin #4)
	One	Grey	Ground	2	Starter solenoid (K2) (pin #2)
	One	Grey	Trigger	3	Connector CF1 (Pin #5)
	One	Grey	Power-out	4	Alternator (Pin #1)
Fuel Heater (K4) Near oil filter					
	One	Red	Power-in	4	BAT1 (+)/Circuit breaker (load side)
	One	Grey	Ground	2	Engine Ground Block
	One	Green	Trigger	3	Connector CF1 (Pin #50)
	One	Red	Power-out	1	Fuel Line Heater

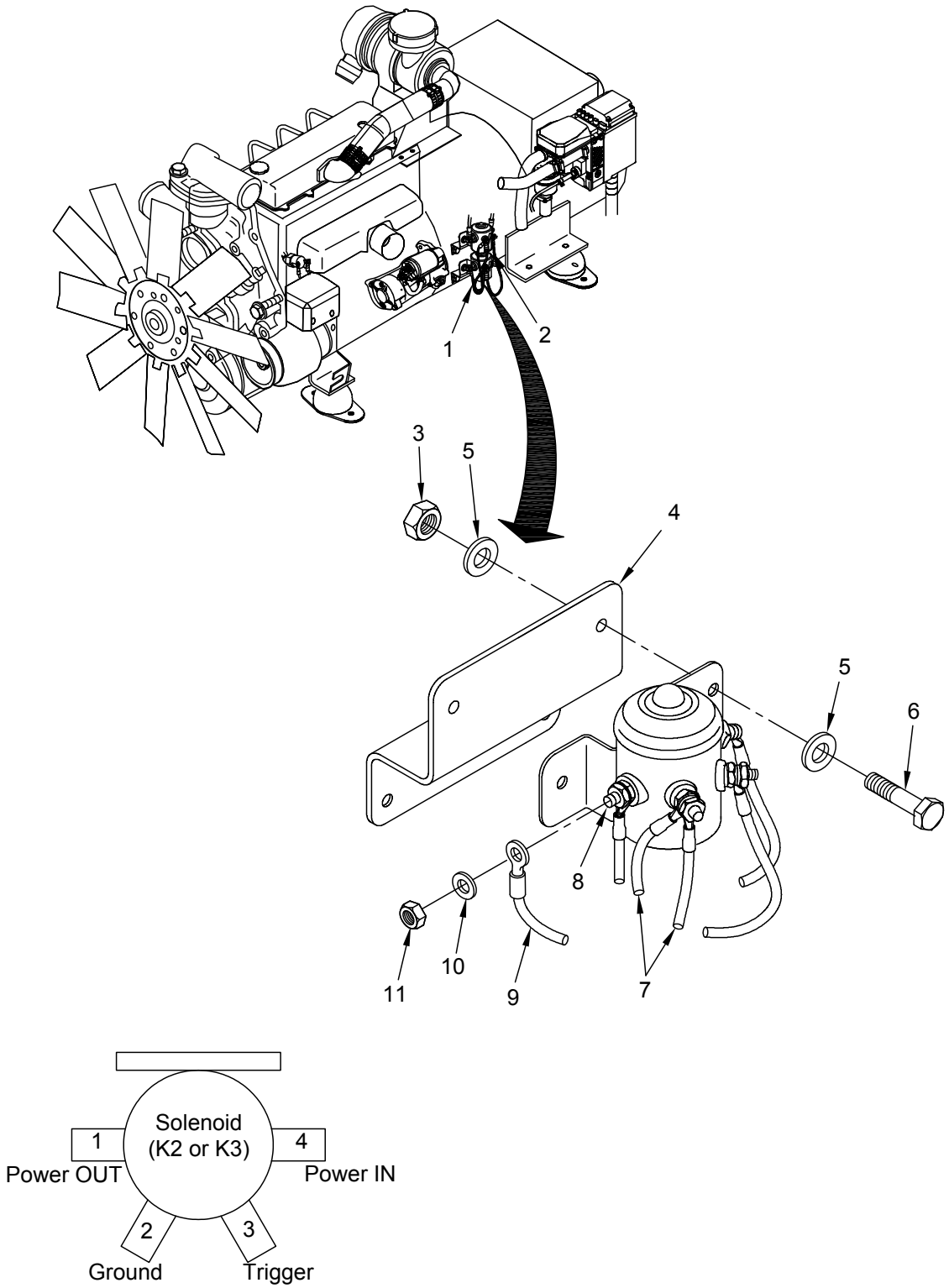

Figure 1. K2 or K3 Solenoid Removal/Replacement.

END OF TASK

K4 SOLENOID REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Solenoid

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

NOTE

The following procedure is applicable to the K4 solenoid assembly associated with the TMSS-MED.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove rear access panel (not shown) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

If markings on wire(s) and/or solenoid terminal(s) are missing, tag wire(s) and/or solenoid terminal(s) to help with identifying proper connections when replacing solenoid.

5. Remove and retain four nuts (Figure 2, Item 13) and lock washers (Figure 2, Item 12) that secure terminal lugs (Figure 2, Item 11) to solenoid terminals (Figure 2, Item 10).

REMOVAL – Continued

6. Disconnect terminal lugs (Figure 2, Item 11) from solenoid terminals (Figure 2, Item 10). Loosely install nuts (Figure 2, Item 13) and lock washers (Figure 2, Item 12) back onto solenoid terminals (Figure 2, Item 10).

7. Remove and retain two nuts (Figure 2, Item 4), bolts (Figure 2, Item 8), and four flat washers (Figure 2, Item 5) that secure solenoid (Figure 2, Item 7) to mounting bracket (Figure 2, Item 6).

8. Remove solenoid (Figure 2, Item 7) from mounting bracket (Figure 2, Item 6) on Genset and discard.

END OF TASK

REPLACEMENT

1 Secure solenoid (Figure 2, Item 7) to mounting bracket (Figure 2, Item 6) on Genset using two nuts (Figure 2, Item 4), bolts (Figure 2, Item 8), and four flat washers (Figure 2, Item 5).

NOTE

Prior to performing the following step, inspect terminal lugs (Figure 2, Item 11) and associated wiring. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire. Inspect solenoid terminals (Figure 2, Item 10) ensure that no damage or corrosion exists.

2. Connect terminal lugs (Figure 2, Item 11) to solenoid terminals (Figure 2, Item 10). Secure using four nuts (Figure 2, Item 13) and lock washers (Figure 2, Item 12). (See Table 1).

3 Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

4. Install access panel(s) (not shown) and cargo restraints (not shown).

5. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

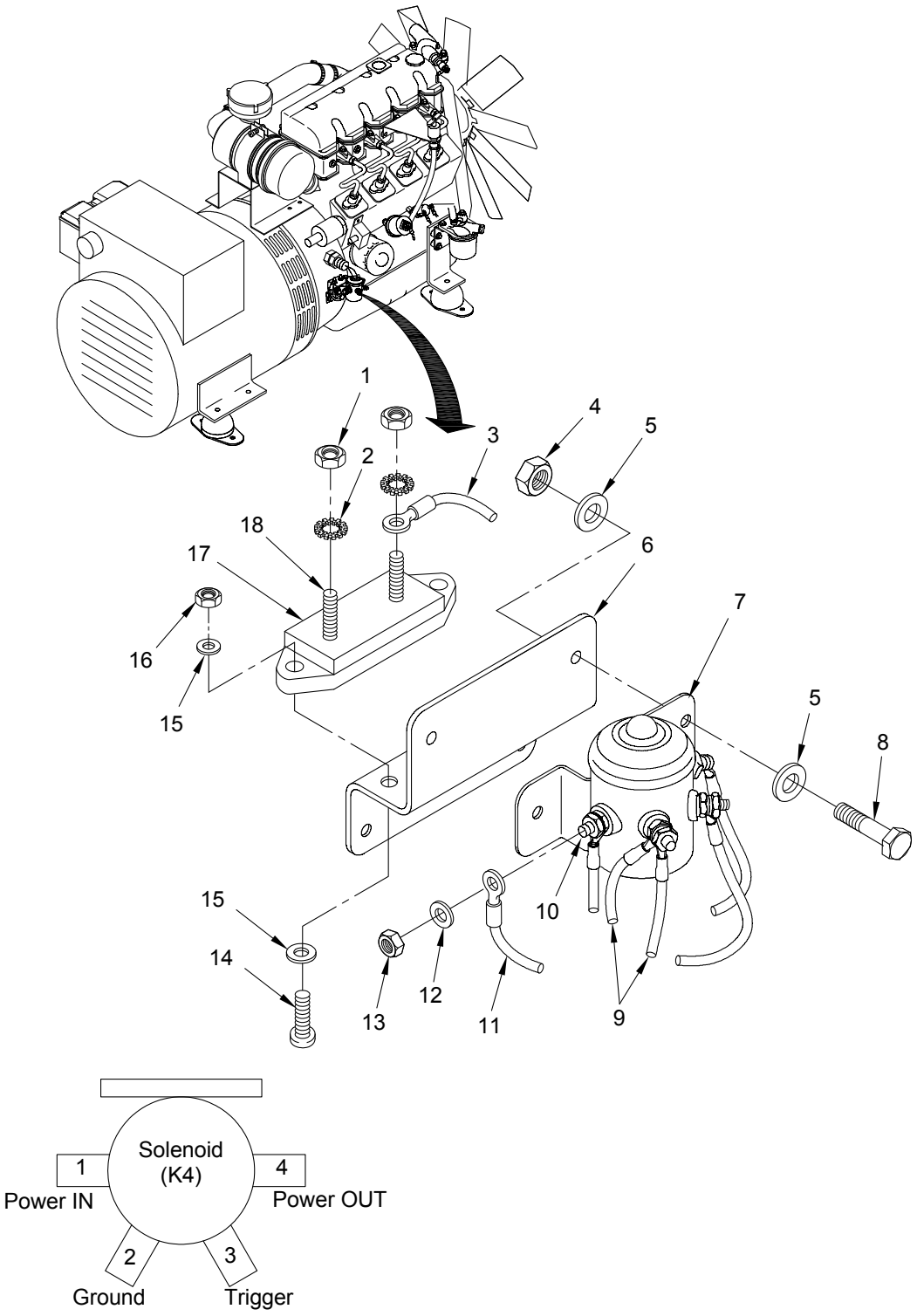

Figure 2. K4 Solenoid and Circuit Breaker Removal/Replacement.

END OF TASK

K4 SOLENOID CIRCUIT BREAKER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Circuit breaker

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

NOTE

The following procedure is applicable to the K4 solenoid assembly associated with the TMSS-MED.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove rear access panel (not shown) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

If markings on wire(s) and/or solenoid terminal(s) are missing, tag wire(s) and/or solenoid terminal(s) to help with identifying proper connections when replacing solenoid.

5. Remove and retain two nuts (Figure 2, Item 1) and lock washers (Figure 2, Item 2) that secure terminal lugs (Figure 2, Item 3) to circuit breaker terminals (Figure 2, Item 18).

REMOVAL – Continued

6. Disconnect terminal lugs (Figure 2, Item 3) from circuit breaker terminals (Figure 2, Item 18). Loosely install nuts (Figure 2, Item 1) and lock washers (Figure 2, Item 2) back onto circuit breaker terminals (Figure 2, Item 18).

7. Remove and retain two lock nuts (Figure 2, Item 16), machine screws (Figure 2, Item 14), and four flat washers (Figure 2, Item 15) that secure circuit breaker (Figure 2, Item 17) to mounting bracket (Figure 2, Item 6).

8. Remove circuit breaker (Figure 2, Item 17) from mounting bracket (Figure 2, Item 6) on Genset and discard.

END OF TASK

REPLACEMENT

1 Secure circuit breaker (Figure 2, Item 17) to mounting bracket (Figure 2, Item 6) on Genset using two lock nuts (Figure 2, Item 16), machine screws (Figure 2, Item 14), and four flat washers (Figure 2, Item 15).

NOTE

Prior to performing the following step, inspect terminal lugs (Figure 2, Item 3) and associated wiring. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire. Inspect circuit breaker terminals (Figure 2, Item 18) ensure that no damage or corrosion exists.

2. Connect terminal lugs (Figure 2, Item 3) to circuit breaker terminals (Figure 2, Item 18). Secure using two nuts (Figure 2, Item 1) and lock washers (Figure 2, Item 2). (See Table 1).

3 Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

4. Install access panel(s) (not shown) and cargo restraints (not shown).

5. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET STARTER

GENERAL

This work package provides information on the removal and replacement of the Genset starter. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

STARTER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Starter

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

REMOVAL

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove front access panel (Figure 1, Item 2) and set aside.
4. Remove rear access panel (not shown) and disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

CAUTION

To prevent serious injury to personnel place battery cable far enough away from battery terminal so that cable does not inadvertently touch positive (+) terminal on battery.

5. Disconnect red cable(s) from positive (+) terminal of battery and set aside (if necessary, refer to procedure in (WP 0041) of this TM).
6. Remove and retain nut (Figure 1, Item 9) from starter terminal (Figure 1, Item 4).
7. Disconnect battery cable (Figure 1, Item 8) from starter terminal (Figure 1, Item 4) and set aside. Loosely install nut (Figure 1, Item 10) and lock washer (Figure 1, Item 9) onto starter terminal (Figure 1, Item 4).
8. Disconnect terminal (Figure 1, Item 7) from terminal on starter.

REMOVAL – Continued

9. Remove and retain lower mounting bolt (Figure 1, Item 6) from starter (Figure 1, Item 5).

10. Remove and retain upper mounting bolt (Figure 1, Item 3) from starter (Figure 1, Item 5).

11. Pull starter (Figure 1, Item 5) away from starter mount on engine assembly and set aside.

END OF TASK

REPLACEMENT

1. Insert starter (Figure 1, Item 5) into the starter mount on engine and secure using two bolts (Figure 1, Items 3 and 6).

2. Using torque wrench, tighten two bolts (Figure 1, Items 3 and 6) on starter (Figure 1, Item 5) to 93~113 ft./lb (69~83 n-m/9.5~11.5 kgf-m).

NOTE

Prior to performing the following step, inspect terminals on battery cable (Figure 1, Item 8) and second red wire (Figure 1, Item 7) and wire for connectivity. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire.

3. Connect battery cable (Figure 1, Item 8) to starter terminal (Figure 1, Item 4). Secure to starter terminal (Figure 1, Item 4) with nut (Figure 1, Item 9).

4. Connect terminal lug (Figure 1, Item 7) to terminal on starter (Figure 1, Item 5).

5. Connect battery cable (Figure 1, Item 8) to positive (+) terminal of battery (if necessary, refer to procedure in (WP 0041) of this TM).

6. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM) and install rear access panel (not shown).

7. Install front access panel (Figure 1, Item 2).

8. Install cargo restraints (not shown).

9. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

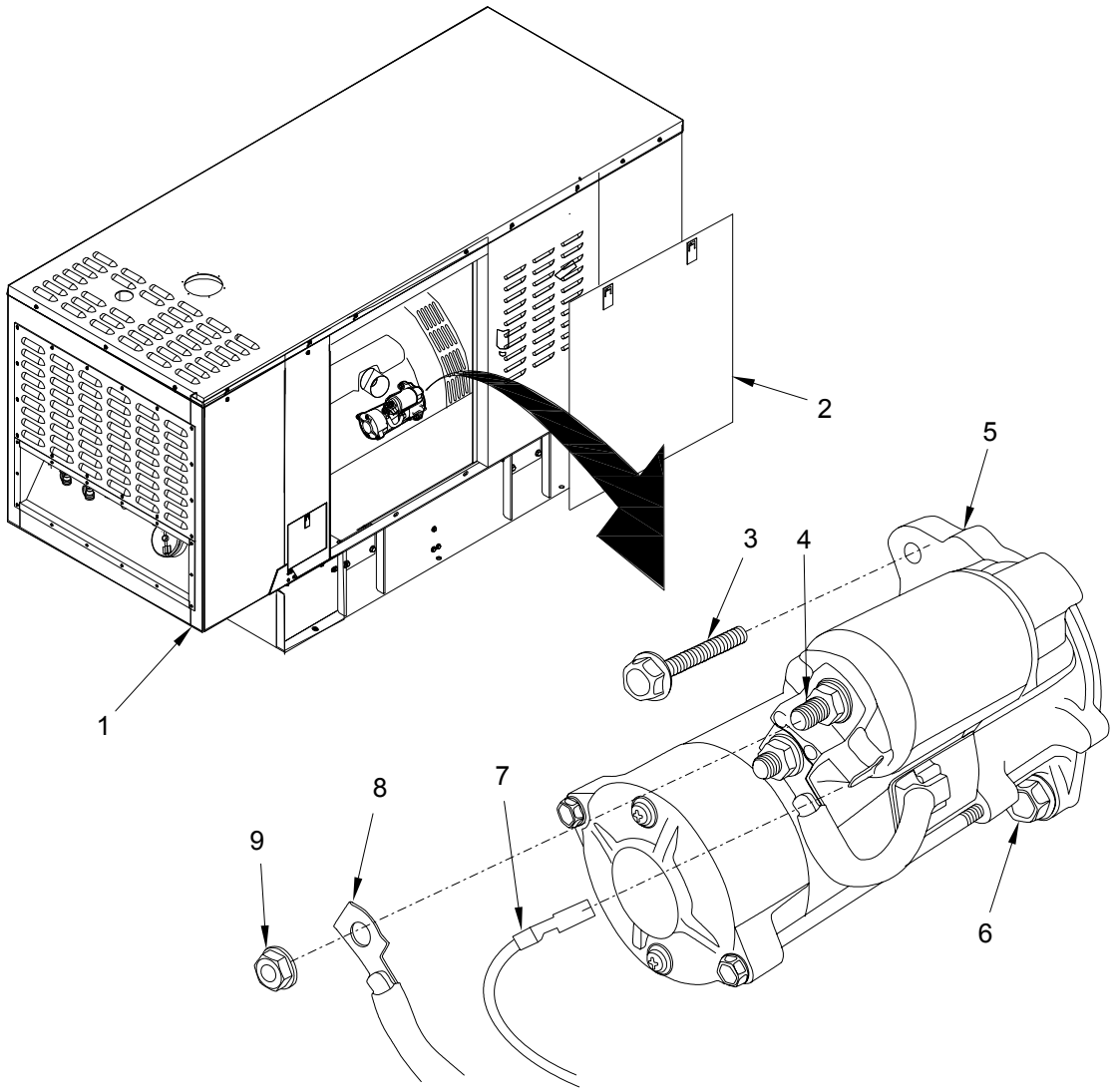

Figure 1. Starter Removal/Replacement.

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET DIESEL SPEED SENSOR

GENERAL

This work package provides information on the removal and replacement of the Genset diesel speed sensor. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

DIESEL SPEED SENSOR REMOVAL/INSPECT/TEST/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
Speed sensor, diesel
Anti-seize compound (WP 0168, Item 3)
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

NOTE

The diesel speed sensor (Figure 1, Item 4) is located just left of the fuel pump.

TEST

1. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.
2. Set multimeter to read VAC.
3. Touch terminals (figure 1, items 5 and 6) of diesel engine speed sensor (Figure 1, Item 4) with meter leads. Multimeter should read between 2.5 and 5 VAC. If meter indication not with-in spec replace pickup sensor.

END OF TASK

REMOVAL

1. Shut Genset (Figure 1, Item 1) down and set BATTERY SWITCH to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 1, Item 2).
3. Remove rear access panel (Figure 1, Item 2) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

REMOVAL – Continued

5. Disconnect two terminals (Figure 1, Items 5 and 6) coming off of diesel speed sensor (Figure 1, Item 4) from engine harness.

NOTE

When performing the following step, be observant of all items around the diesel speed sensor (Figure 1, Item 4).

6. Loosen locking nut (Figure 1, Item 3) on diesel speed sensor (Figure 1, Item 4).

7. Loosen diesel speed sensor (Figure 1, Item 4) and remove from engine.

END OF TASK

INSPECTION

Check head of diesel speed sensor (Figure 1, Item 4) for evidence of scraping or striking the fly wheel. If damage is evident replace sensor with new one.

END OF TASK

REPLACEMENT

1. Clean off old anti-seize compound from all threaded areas.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

NOTE

Do not get anti-seize compound on ends of diesel speed sensor (Figure 1, Item 4).

2. Apply anti-seize compound to threads of diesel speed sensor (Figure 1, Item 4).

CAUTION

When the following step is being performed, diesel speed sensor (Figure 1, Item 4) should screw in without resistance. Do not force diesel speed sensor (Figure 1, Item 4) or cross thread. Failure to observe this caution can result in damage to the engine.

3. Install diesel speed sensor (Figure 1, Item 4). Tighten until diesel speed sensor (Figure 1, Item 4) bottoms out.

REPLACEMENT – Continued

NOTE

Failure to back diesel speed sensor (Figure 1, Item 4) off 1/4 turn can result in magnetic pickup on diesel speed sensor (Figure 1, Item 4) striking the fly wheel and becoming damaged thus making it unserviceable.

Backing diesel speed sensor (Figure 1, Item 4) off more than 1/4 turn can prevent magnetic pickup on diesel speed sensor (Figure 1, Item 4) from detecting the rotation of the fly wheel.

4. Turn diesel speed sensor (Figure 1, Item 4) back counter clockwise 1/4 turn.
5. Tighten locking nut (Figure 1, Item 3) (clockwise).
6. Connect two terminals (Figure 1, Items 5 and 6) coming off of diesel speed sensor (Figure 1, Item 4) to engine harness.
7. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
8. Install rear access panel (Figure 1, Item 2).
9. Install cargo restraints (not shown).
10. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

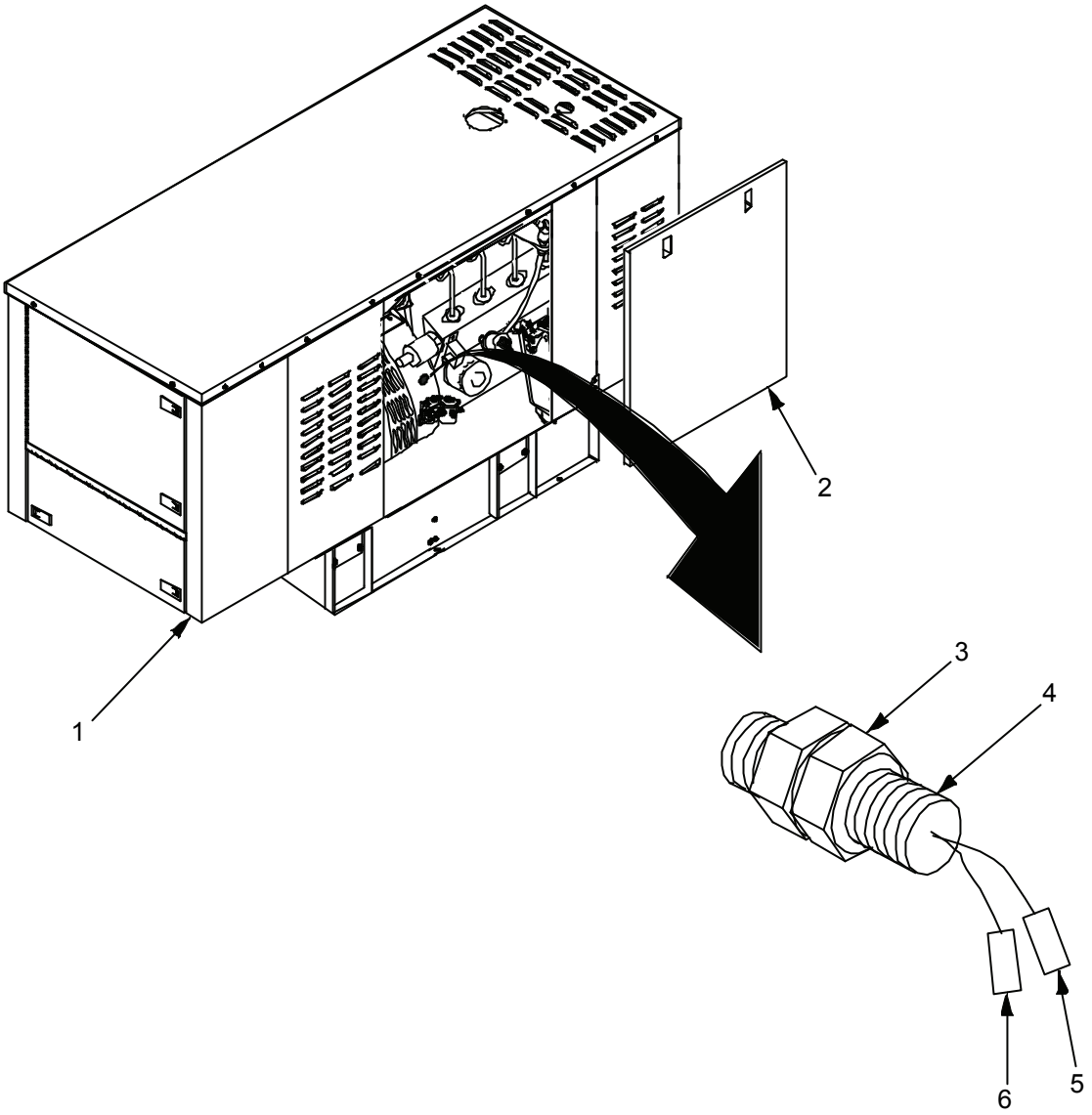

Figure 1. Diesel Speed Sensor Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET COOLANT TEMPERATURE SENSOR

GENERAL

This work package provides information on the removal and replacement of the engine coolant temperature sensor.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

COOLANT TEMPERATURE SENSOR REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

References
WP 0005, WP 0041, WP 0058

Materials/Parts
Temperature coolant sensor
Teflon tape (WP 0168, Item 58)

Equipment Condition
Genset shut down
BATTERY SWITCH – OFF

Personnel Required
One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

Engine coolant temperature sensor is located on the front of the engine in the thermostat housing.

REMOVAL

1. Verify that Genset (Figure 1, Item 15) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.

3. Remove the front and rear access panels (Figure 1, Items 8 and 16) on Genset (Figure 1, Item 15) and set aside.

4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

Steps 5 and 6 are optional.

5. Loosen but do not remove nut (Figure 1, Item 4) and bolt (Figure 1, Item 2) that secures exhaust pipe cap. Remove exhaust pipe cap (Figure 1, Item 3) and set aside.

6. Remove and retain 20 bolts (Figure 1, Item 7), lock washers (Figure 1, Item 6), and flat washers (Figure 1, Item 5) that secure top access panel (Figure 1, Item 1) to Genset (Figure 1, Item 15). Remove top access panel (Figure 1, Item 1) and set aside.

REMOVAL – Continued

7. Drain engine coolant as described in (WP 0058).

NOTE

Place towels or pads below radiator to absorb any excess fluid.

8. Remove nut (Figure 1, Item 13) and washer (Figure 1, Item 12) securing terminal lug (Figure 1, Item 11) to coolant temperature sensor (Figure 1, Item 10). Mark and disconnect terminal lug (Figure 1, Item 11).

NOTE

When performing the following step, use a second wrench to keep mounting elbow from turning.

When performing the following step, be cautious of items surrounding coolant temperature sensor (Figure 1, Item 10).

9. Remove coolant temperature sensor (Figure 1, Item 10) from thermostat housing (Figure 1, Item 9).

END OF TASK

REPLACEMENT

1. Apply teflon tape to threads of coolant temperature sensor (Figure 1, Item 10).

CAUTION

When the following step is being performed, do not force coolant temperature sensor or cross thread. Failure to observe this caution can result in damage to the engine.

NOTE

When performing the following step, use a second wrench to keep mounting nut (Figure 1, Item 14) from turning.

2. Install coolant temperature sensor (Figure 1, Item 10) onto thermostat housing (Figure 1, Item 9) and tighten.

3. Using torque wrench, tighten coolant temperature sensor (Figure 1, Item 10) on thermostat housing (Figure 1, Item 9) to 9~13 ft./lb (12~18 n-m/1.2~1.8 kgf-m).

NOTE

Prior to performing the following step, inspect terminal lug (Figure 1, Item 11) and terminal for connectivity. Ensure that terminal lug has not become brittle and that there are no nicks, cuts or other damage to terminal lug.

4. Install terminal lug (Figure 1, Item 11) onto coolant temperature sensor (Figure 1, Item 10) and secure with nut
(Figure 1, Item 13) and washer (Figure 1, Item 12).

5. Install top access panel (Figure 1, Item 1) onto Genset (Figure 1, Item 15) and secure using 20 bolts (Figure 1, Item 7), lock washers (Figure 1, Item 6) and flat washers (Figure 1, Item 5).

6. Install exhaust pipe cap (Figure 1, Item 3) and tighten nut (Figure 1, Item 4) and bolt (Figure 1, Item 2) that secure exhaust pipe cap (Figure 1, Item 3).

REPLACEMENT – Continued

7. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
8. Replace front and rear access panels (Figure 1, Items 8 and 16) on Genset (Figure 1, Item 15).
9. Install cargo restraints (not shown).
10. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

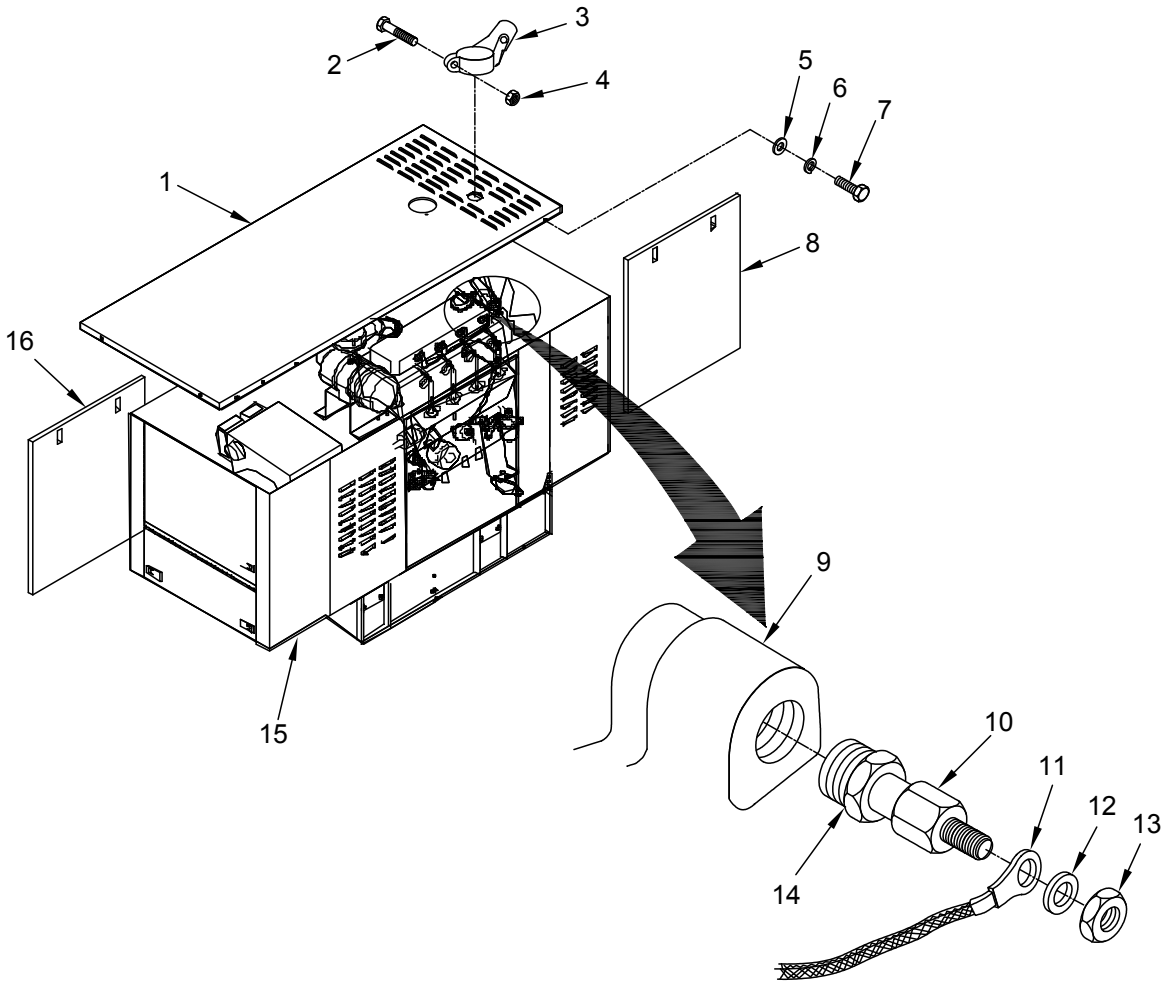

Figure 1. Coolant Temperature Sensor Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET COOLANT TEMPERATURE SWITCH

GENERAL

This work package provides information on the removal and replacement of the engine coolant temperature switch.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

COOLANT TEMPERATURE SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Coolant temperature switch
Teflon tape (WP 0168, Item 58)

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove front access panel (Figure 1, Item 2) and set aside.
3. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
4. Remove rear access panel (not shown) and disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

The coolant temperature switch (Figure 1, Item 3) is located above the alternator.

Prior to performing the following step, mark terminal lugs (Figure 1, Items 5) and terminals for connectivity.

5. Remove and retain two screws (Figure 1, Item 4) and terminal lugs (Figure 1, Items 5) connected to coolant temperature switch (Figure 1, Item 3).

NOTE

When performing the following step, be cautious of items surrounding coolant temperature switch (Figure 1, Item 3).

REMOVAL – Continued

NOTE

When performing the following step, use a second wrench to keep mounting elbow from turning.

6. Remove coolant temperature switch (Figure 1, Item 3) from engine.

END OF TASK

REPLACEMENT

1. Apply Teflon tape to threads of coolant temperature switch (Figure 1, Item 3).

CAUTION

When the following step is being performed, do not force temperature coolant switch (Figure 1, Item 3) or cross thread. Failure to observe this caution can result in damage to the engine.

NOTE

When performing the following step, use a second wrench to keep mounting elbow from turning.

2. Install coolant temperature switch (Figure 1, Item 3) onto mounting elbow and hand tighten.

3. Using torque wrench, tighten coolant temperature switch (Figure 1, Item 3) to 9~13 ft./lb (12~18 n-m/ 1.2~1.8 kgf-m).

NOTE

Prior to performing the following step, inspect terminal lugs (Figure 1, Item 5) and terminals for connectivity. Ensure that terminal lug has not become brittle and that there are no nicks, cuts or other damage to terminal lug.

4. Secure two terminal lugs (Figure 1, Item 5) to coolant temperature switch (Figure 1, Item 3) with two screws (Figure 1, Item 4).

5. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM) and install rear access panel (not shown).

6. Install front access panel (Figure 1, Item 2).

7. Install cargo restraints (not shown).

8. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

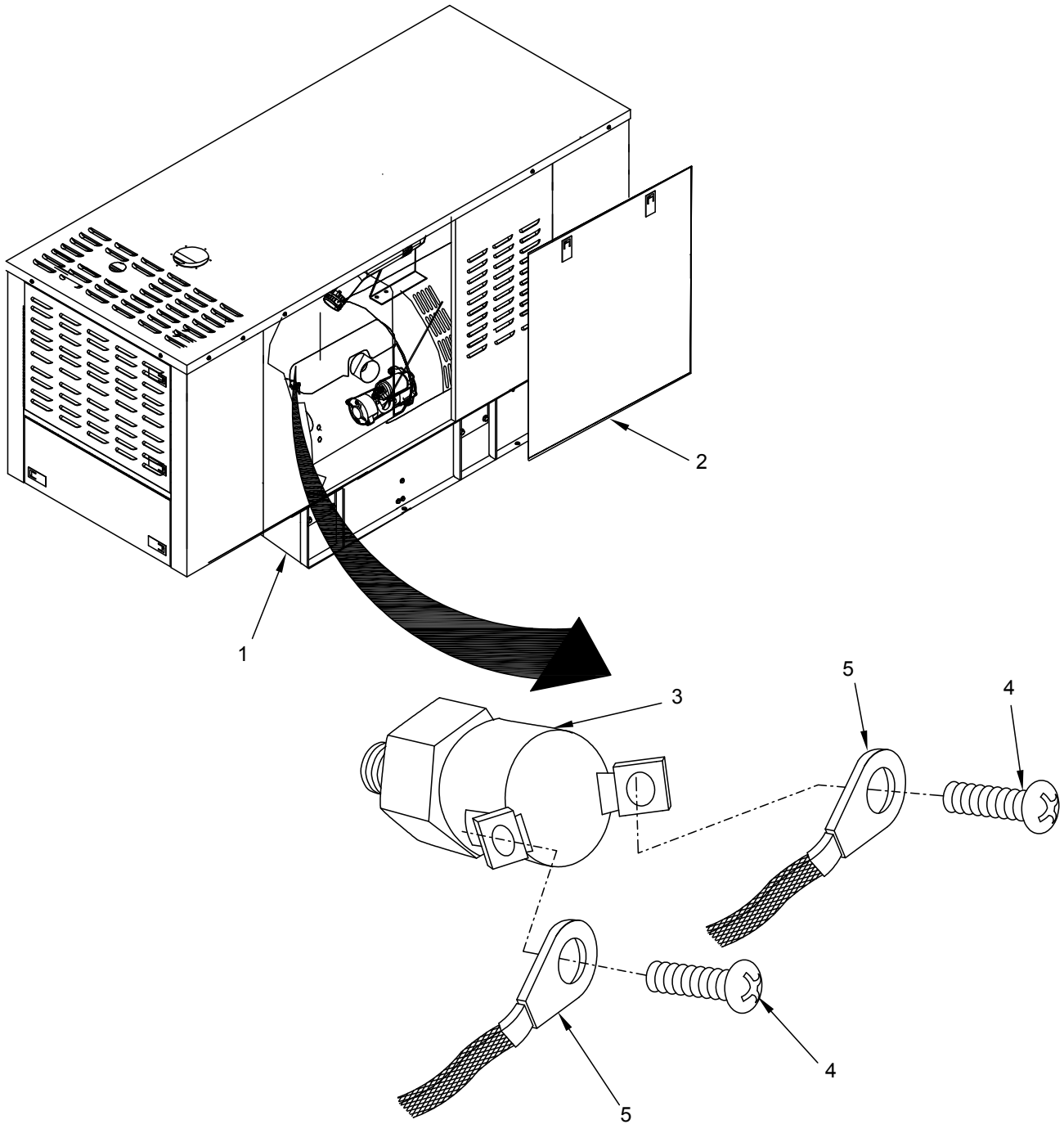

Figure 1. Coolant Temperature Switch Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET THERMOSTAT

GENERAL

This work package provides information on the removal and replacement of the Genset thermostat. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

THERMOSTAT REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Thermostat
Gasket
Abrasive mesh cloth (WP 0168, Item 13)
Cloth, cleaning (WP 0168, Item 14)
Gasket sealant (WP 0168, Item 49)

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in a operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 1, Item 16) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the front and rear access panels (Figure 1, Items 5 and 17) on Genset (Figure 1, Item 16) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
5. Loosen but do not remove nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secures exhaust pipe cap. Remove exhaust pipe cap (Figure 1, Item 2) and set aside.
6. Remove and retain 20 bolts (Figure 1, Item 18), lock washers (Figure 1, Item 19) and flat washers (Figure 1, Item 20) that secure top access panel (Figure 1, Item 4) to Genset (Figure 1, Item 16). Remove top access panel (Figure 1, Item 4) and set aside.

NOTE

Place towels or pads below radiator to absorb any excess fluid.

7. Loosen clamp (Figure 1, Item 10) and remove coolant hose (Figure 1, Item 11) from thermostat housing (Figure 1, Item 8).

REMOVAL – Continued

8. Remove and retain nut (Figure 1, Item 15) and washer (Figure 1, Item 14) that secures wire terminal (Figure 1, Item 6) to thermostat housing (Figure 1, Item 8).

9. Remove and retain two bolts (Figure 1, Item 7) that secure thermostat housing (Figure 1, Item 8) to water pump (Figure 1, Item 13).

10. Remove and retain thermostat housing (Figure 1, Item 8) from water pump housing (Figure 1, Item 13).

11. Tap on thermostat (Figure 1, Item 12) to break seal and remove thermostat (Figure 1, Item 12).

12. Remove gasket (Figure 1, Item 9) from thermostat (Figure 1, Item 12) and water pump housing (Figure 1, Item 13).

END OF TASK

REPLACEMENT

CAUTION

When performing the following step, do not damage the water pump or thermostat housing.

1. Scrape off old gasket material from thermostat housing and water pump housing. If necessary, clean area with 220 grit sandpaper or abrasive mesh cloth to remove all residue.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

2. Place thin layer of gasket sealant to top and bottom of gasket (Figure 1, Item 9) to hold in place during assembly.

3. Install gasket (Figure 1, Item 9) onto water pump housing (Figure 1, Item 13).

4. Install thermostat (Figure 1, Item 12) and thermostat housing (Figure 1, Item 8) onto water pump housing (Figure 1, Item 13).

5. Secure thermostat housing (Figure 1, Item 8) to water pump housing (Figure 1, Item 13) using two bolts (Figure 1, Item 7).

6. Using torque wrench, tighten two bolts (Figure 1, Item 7) on thermostat housing (Figure 1, Item 8) to 14~21 ft./lb (19~28 n-m/1.9~2.9 kgf-m).

NOTE

Prior to performing the following step: inspect coolant hose for cracks, swelling, or other obvious deterioration. Inspect clamp, verify that no damage, corrosion, or other obvious deterioration is present.

7. Install coolant hose (Figure 1, Item 11) onto thermostat housing (Figure 1, Item 8) and tighten clamp (Figure 1, Item 10).

REPLACEMENT – Continued

NOTE

Prior to performing the following step, inspect wire and terminal for connectivity. Ensure that wires have not become brittle and that there are no nicks, cuts or other damage to wire.

8. Connect wire terminal (Figure 1, Item 6) to thermostat housing (Figure 1, Item 8) secure with nut (Figure 1, Item 15) and washer (Figure 1, Item 14).

9. Install top access panel (Figure 1, Item 4) onto Genset (Figure 1, Item 16) and secure using 20 bolts (Figure 1, Item 18), lock washers (Figure 1, Item 19) and flat washers (Figure 1, Item 20).

10. Install exhaust pipe cap (Figure 1, Item 2) and tighten nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secure exhaust pipe cap (Figure 1, Item 2).

11. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM) and install rear access panel (not shown).

12. Replace front and rear access panels (Figure 1, Items 5 and 17) on Genset (Figure 1, Item 16).

13. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

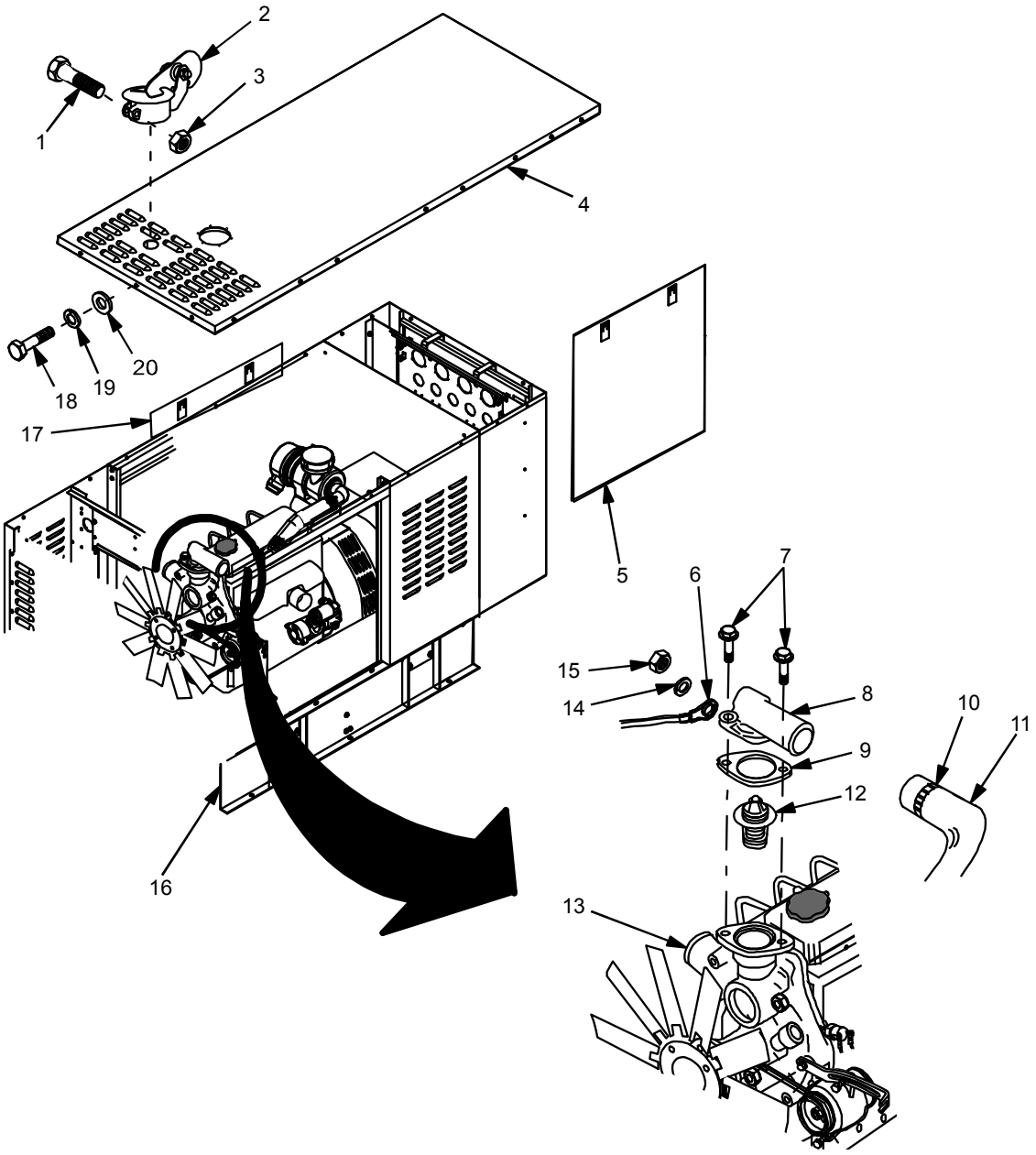

Figure 1. Thermostat Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET ENGINE COOLANT

GENERAL

This work package provides information on the removal and replacement of engine coolant in the Genset engine. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

ENGINE COOLANT REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses
Drain pan

Materials/Parts
Coolant (WP 0168, Item 2)
Cloth, cleaning (WP 0168, Item 14)
Teflon tape (WP 0168, Item 58)

Personnel Required
One

References
WP 0005

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 1, Item 6) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the front and rear access panels (Figure 1, Items 1 and 5) on Genset (Figure 1, Item 6) and set aside.

NOTE

Coolant drain plug (Figure 1, Item 7) is located on the front base of the Genset enclosure.

4. Place drain pan under coolant drain plug (Figure 1, Item 7). Remove and retain coolant drain plug (Figure 1, Item 7).
5. Insert one end of a drain hose into the engine coolant outlet and place opposite end in drain pan. Use of a drain hose will reduce spillage.

NOTE

Collect coolant in an appropriate chemical-resistant container for disposal through the local servicing Defense Reutilization and Marketing Office.

6. Open coolant drain valves (Figure 1, Item 8 and 9) inside Genset enclosure. Allow coolant to drain into drain pan.

REMOVAL – Continued

WARNING

Do not remove radiator cap until coolant temperature is below its boiling point. Radiator can erupt and cause severe burns. Once cooling has occurred, loosen cap slightly to relieve any excess pressure before removing the cap completely. Failure to observe this warning can result in severe injury to personnel.

7. Once flow of coolant starts to slow, remove radiator cap (Figure 1, Item 2).

8. Loosen clamp (Figure 1, Item 4), remove coolant reservoir bottle (Figure 1, Item 3) and dump contents into drain pan. Rinse coolant reservoir bottle (Figure 1, Item 3) with clean water.

END OF TASK

REPLACEMENT

1. Return coolant reservoir bottle (Figure 1, Item 3) to holder and secure with clamp (Figure 1, Item 4).

2. Close coolant drain valves (Figure 1, Items 8 and 9).

3. Remove drain hose and return to storage.

4. Wrap coolant drain plug threads (Figure 1, Item 7) with Teflon tape, install and tighten.

NOTE

Prior to performing the following step:

- Inspect radiator for dents, holes, or leaks.
- Inspect radiator hoses for cracks, swelling, or other obvious deterioration.
- Inspect hose clamps. Verify that clamps are secure and that no damage or other obvious deterioration is present.

5. Place funnel into radiator cap (Figure 1, Item 2) through access hole on top of the Genset.

6. Add proper coolant/water mix (see Table 1) as necessary to bring the radiator to proper level. Replace the radiator cap (Figure 1, Item 2) and tighten.

7. Add coolant mix as necessary to bring the coolant reservoir bottle (Figure 1, Item 3) 1/3 to 1/2 full.

8. Install reservoir bottle cap and tighten.

9. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM. Run for 15 minutes until operational temperature.

10. Shut down Genset (Figure 1, Item 6) in accordance with Genset Stop Procedure (WP 0005).

WARNING

Do not remove radiator cap until coolant temperature is below its boiling point. Radiator can erupt and cause severe burns. Once cooling has occurred, loosen cap slightly to relieve any excess pressure before removing the cap completely. Failure to observe this warning can result in severe injury to personnel.

11. Check Genset coolant levels. Coolant should be one inch below the overflow level. Bottle should be 1/3 to 1/2 full when cool. If levels do not meet these requirements repeat steps 4 through 9 until levels are reached.

REPLACEMENT – Continued

12. Replace front and rear access panels (Figure 1, Items 1 and 5) on Genset (Figure 1, Item 6).
13. Install cargo restraints (not shown) to rear of Genset.
14. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

NOTE

Table 1. Radiator Coolant to Water Ratios.

Conditions	Coolant (by volume)	Water (by volume)	Freezing point	Boiling point
Normal	40%	60%	-10°F (-23.33°C)	260°F (126.66°C)
	50%	50%	-34°F(-36.66°C)	265°F (129.44°C)
Arctic	60%	40%	-62°F (-52.22°C)	270°F (132.22°C)

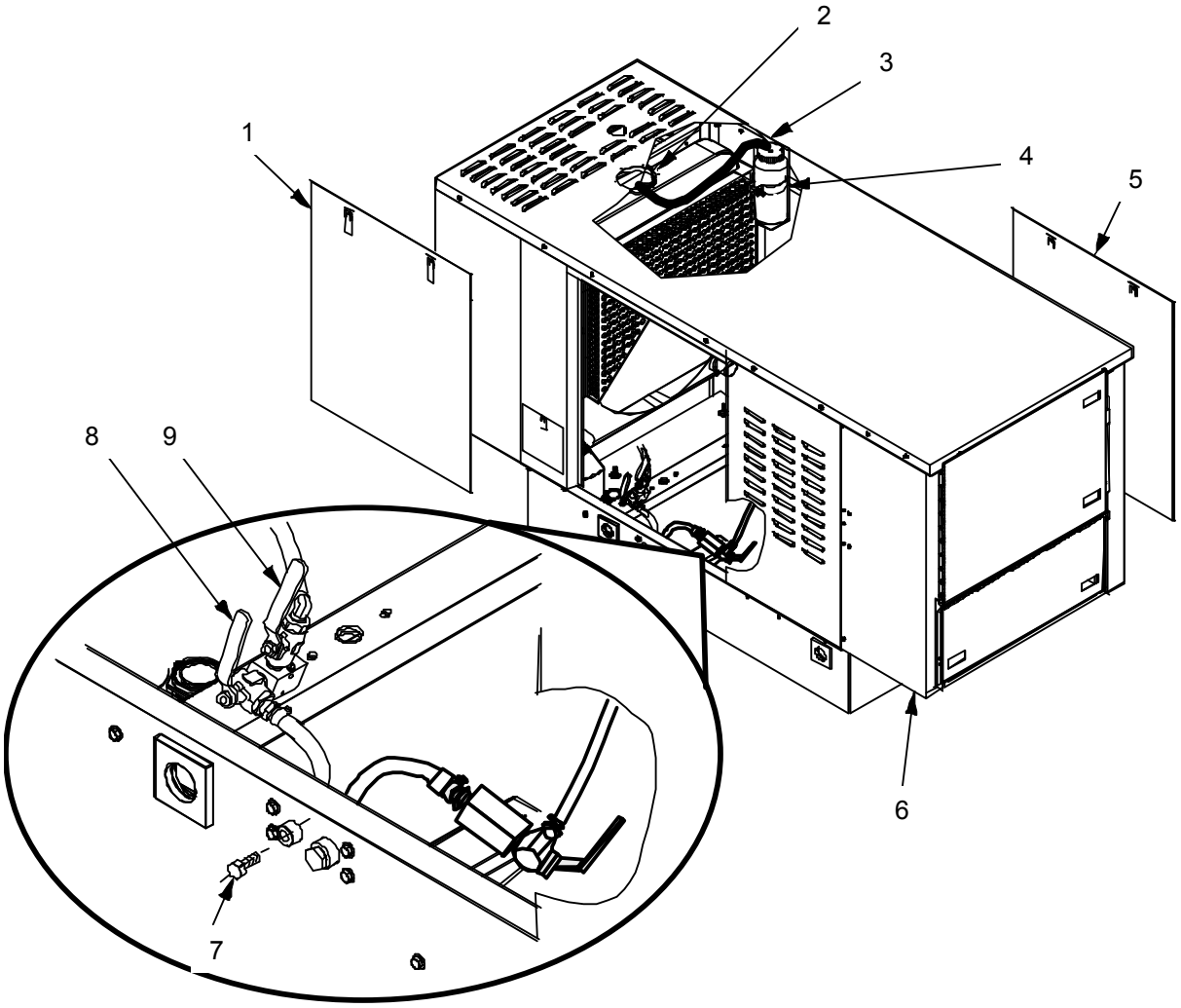

Figure 1. Engine Coolant Removal/Replacement.

END OF TASK

ENGINE COOLANT RESERVOIR BOTTLE REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Safety glasses

Materials/Parts
Coolant bottle
Coolant (WP 0168, Item 2)
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH- OFF

WARNING

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 2, Item1) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove the rear access panel (Figure 2, Item 2) on Genset (Figure 2, Item 1) and set aside.
3. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
4. Disconnect overflow tube (Figure 2, Item 7) from coolant reservoir bottle (Figure 2, Item 3).
5. Loosen, but do not remove, bolt (Figure 2, Item 4), nut (Figure 2, Item 6) and two flat washers (Figure 2, Item 5).
6. Remove coolant reservoir bottle (Figure 2, Item 3) and properly dispose of reservoir bottle (Figure 2, Item 3) and contents.

END OF TASK

REPLACEMENT

1. Insert coolant reservoir bottle (Figure 2, Item 3) and secure using bolt (Figure 2, Item 4), nut (Figure 2, Item 6) and two flat washers (Figure 2, Item 5).
2. Connect overflow tube (Figure 2, Item 7) to coolant reservoir bottle (Figure 2, Item 3).
3. Add coolant mix as necessary to bring the coolant reservoir bottle (Figure 2, Item 3) 1/3 to 1/2 full.

REPLACEMENT - Continued

4. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

5. Start Genset (Figure 2, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM. Run for 15 minutes until operational temperature and observe coolant level in reservoir bottle (Figure 2, Item 3). If necessary add coolant mix.

6. Replace rear access panel (Figure 2, Item 2) on Genset (Figure 2, Item 1).

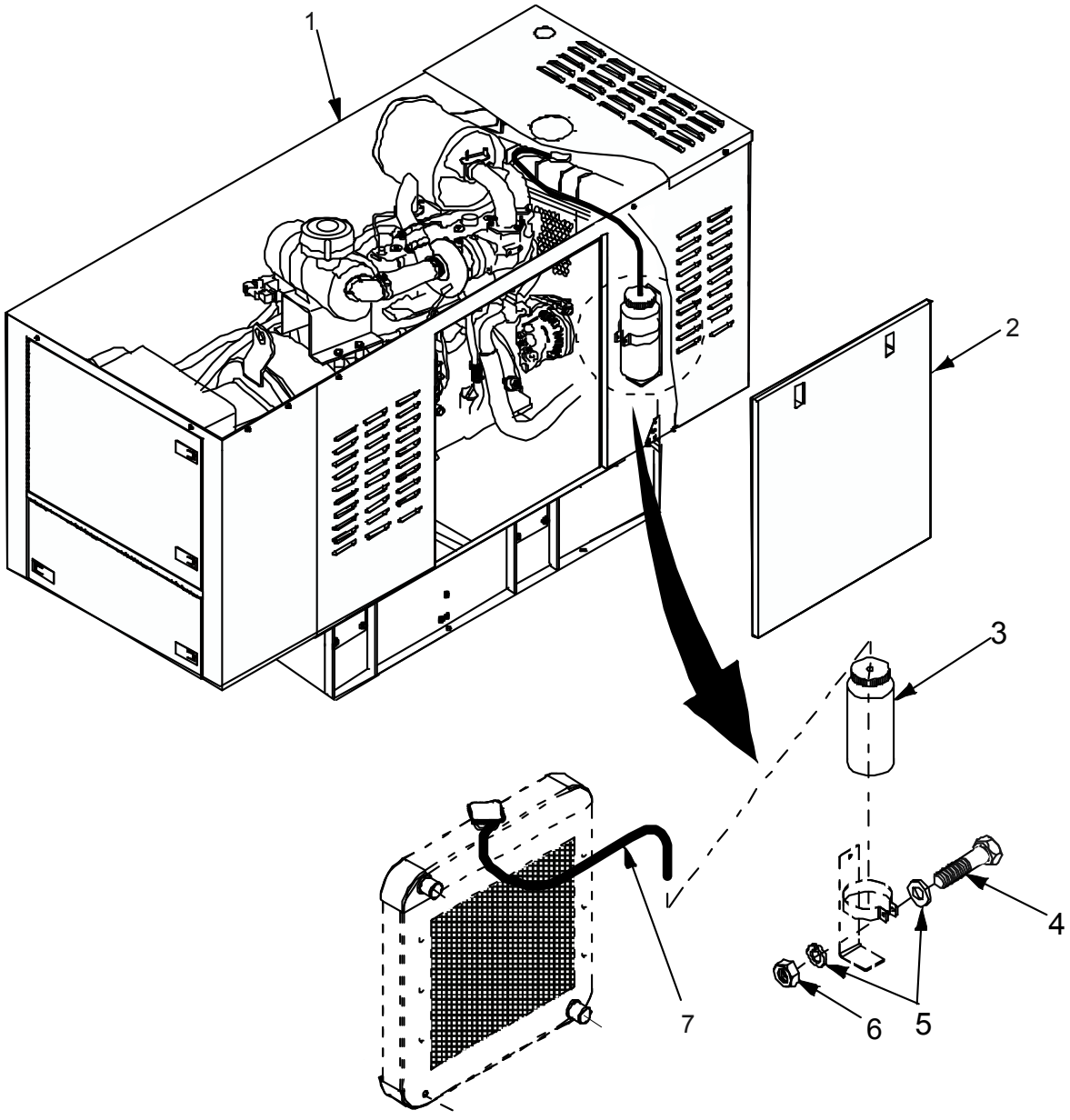

Figure 2. Engine Coolant Reservoir Bottle Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET RADIATOR

GENERAL

This work package provides information on the removal and replacement of the Genset radiator, hoses, and clamps. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

RADIATOR, HOSES AND CLAMPS REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Drain pan
Safety glasses

Materials/Parts
Radiator hose(s)
Clamps
Cloth, cleaning (WP 0168, Item 14)
Coolant (WP 0168, Item 2)

Personnel Required
One

References
WP 0005, WP 0041, WP 0058
WP 0062

Equipment Condition
Genset shut down
BATTERY switch – OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Do not remove radiator cap until coolant temperature is below its boiling point. Radiator can erupt and cause severe burns. Once cooling has occurred, loosen cap slightly to relieve any excess pressure before removing the cap completely. Failure to observe this warning can result in severe injury to personnel.

HOSE AND CLAMPS

REMOVAL

1. Verify that Genset (Figure 1, Item 12) has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.

3. Remove the front and rear access panels (Figure 1, Items 14 and 18) on Genset (Figure 1, Item 12) and set aside.

4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

5. Loosen but do not remove nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secures exhaust pipe cap (Figure 1, Item 2). Remove exhaust pipe cap (Figure 1, Item 2) and set aside.

6. Remove and retain 20 bolts (Figure 1, Item 19) lock washers (Figure 1, Item 20) and flat washers (Figure 1, Item 21) that secures top access panel (Figure 1, Item 22) to Genset (Figure 1, Item 12). Remove top access panel (Figure 1, Item 22) and set aside.

REMOVAL – Continued

7. Drain coolant from radiator as describe in (WP 0058).

8. Loosen hose clamps (Figure 1, Item 9) of radiator hose(s) (Figure 1, Items 8 and 13) to be replaced.

NOTE

Place a drip bucket or absorbent pad under radiator hose(s) to be replaced in case of spillage.

9. Pull radiator hose(s) (Figure 1, Items 8 and 13) away from connection using a twisting motion. Remove radiator hose(s) (Figure 1, Items 8 and 13).

10. Remove and retain hose clamps (Figure 1, Item 9) and discard radiator hose(s) (Figure 1 Items 8 and 13).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps:
- Inspect radiator for dents, holes, or leaks
- If re-using radiator hose(s) (Figure 1, Items 8 and 13), inspect for cracks, swelling, or other obvious deterioration
- If re-using inspect hose clamps (Figure 1, Item 9), verify that no damage or other obvious deterioration is present.

Ensure hose clamps (Figure 1, Item 9) are placed on radiator hoses (Figure 1, Items 8 and 13) so that screws will be accessible after installation.

1. Loosely place hose clamps (Figure 1, Item 9) onto radiator hose(s) (Figure 1, Items 8 and 13) and slide toward center of radiator hose (Figure 1, Items 8 and 13).

NOTE

To ensure a good seal, when the hose clamp (Figure 1, Item 9) is tightened down most radiator connections have a ridge built into them.

2. Install radiator hose(s) (Figure 1, Items 8 and 13) onto radiator and engine connection(s). Ensure radiator hose(s) (Figure 1, Items 8 and 13) are slid back far enough.

CAUTION

Over tightening hose clamps (Figure 1, Item 9) can damage radiator hose(s) (Figure 1, Items 8 and 13) and cause premature failure.

3. Slide hose clamps (Figure 1, Item 9) into proper positions and tighten hose clamps (Figure 1, Item 9), until hose clamps (Figure 1, Item 9) begin to press into radiator hose(s) (Figure 1, Items 8 and 13).

4. Replace coolant as describe in (WP 0058).

5. Install top access panel (Figure 1, Item 22) onto Genset (Figure 1, Item 12) and secure using 20 bolts (Figure 1, Item 19), lock washers (Figure 1, Item 20), and flat washers (Figure 1, Item 21).

REPLACEMENT – Continued

6. Install exhaust pipe cap (Figure 1, Item 2) and tighten nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secure exhaust pipe cap (Figure 1, Item 2).

7. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM) and install rear access panel (Figure 1, Item 18).

8. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM. Run for 15 minutes until engine has reached operational temperature.

WARNING

Do not remove radiator cap until coolant temperature is below its boiling point. Radiator can erupt and cause severe burns. Once cooling has occurred, loosen cap slightly to relieve any excess pressure before removing the cap completely. Failure to observe this warning can result in severe injury to personnel.

9. Check Genset coolant levels. Coolant should be one inch below the overflow level. Bottle should be 1/3 to 1/2 full when cool.

10. Replace front and rear access panels (Figure 1, Items 14 and 18) on Genset (Figure 1, Item 12).

11. Install cargo restraints (not shown) to rear of Genset.

12. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

RADIATOR

REMOVAL

1. Verify that Genset (Figure 1, Item 12) has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.

3. Remove the front and rear access panels (Figure 1, Items 14 and 18) on Genset (Figure 1, Item 12) and set aside.

4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

5. Loosen but do not remove nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secures exhaust pipe cap (Figure 1, Item 2). Remove exhaust pipe cap (Figure 1, Item 2) and set aside.

6. Remove and retain 20 bolts (Figure 1, Item 19), lock washers (Figure 1, Item 20), and flat washers (Figure 1, Item 21), that secures top access panel (Figure 1, Item 22) to Genset (Figure 1, Item 12). Remove top access panel (Figure 1, Item 22) and set aside.

REMOVAL – Continued

WARNING

Do not remove radiator cap or drain until coolant temperature is below its boiling point. Radiator can erupt and cause severe burns. Once cooling has occurred, loosen cap slightly to relieve any excess pressure before removing the cap completely. Failure to observe this warning can result in severe injury to personnel.

7. Drain coolant from radiator (Figure 1, Item 7) as described in (WP 0058).
8. Disconnect overflow hose (Figure 1, Item 5) from radiator (Figure 1, Item 7) and move aside.
9. Remove fan and shroud as described in (WP 0062).
10. Loosen clamp (Figure 1, Item 10) and disconnect drain hose (Figure 1, Item 11) from radiator (Figure 1, Item 7).
11. Remove clamps (Figure 1, Items 9) and hoses (Figure 1, Items 8 and 13).
12. Remove and retain six bolts (Figure 1, Item 17), lock washers (Figure 1, Item 16), and flat washers (Figure 1, Item 15), that secure radiator (Figure 1, Item 7) to frame (Figure 1, Item 4).
13. Remove radiator (Figure 1, Item 7) from frame (Figure 1, Item 4).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps:
- Inspect radiator for dents, holes, or leaks
- If re-using radiator hose(s) (Figure 1, Items 8 and 13), inspect for cracks, swelling, or other obvious deterioration
- If re-using hose clamps (Figure 1, Item 9), inspect and verify that no damage or other obvious deterioration is present.
- Inspect fan, fan belt, water pump and all other exposed engine parts, verify that no damage or other obvious deterioration is present.

Ensure hose clamps (Figure 1, Item 9) are placed on radiator hoses (Figure 1, Items 8 and 13) so that screws will be accessible after installation.

1. Install radiator (Figure 1, Item 7) and secure to frame (Figure 1, Item 4) using six bolts (Figure 1, Item 17), lock washers (Figure 1, Item 16) and flat washers (Figure 1, Item 15),
2. Connect drain hose (Figure 1, Item 11) to radiator (Figure 1, Item 7) and secure with clamp (Figure 1, Item 10).
3. Install fan and shroud as described in (WP 0062).
4. Connect overflow hose (Figure 1, Item 5) to radiator (Figure 1, Item 7).
5. Install hoses (Figure 1, Items 8 and 13) and clamps (Figure 1, Items 9).
6. Add coolant to radiator (Figure 1, Items 7) as described in (WP 0058).

REPLACEMENT – Continued

7. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

8. Install top access panel (Figure 1, Item 22) onto Genset (Figure 1, Item 12) and secure using 20 bolts (Figure 1, Item 19), lock washers (Figure 1, Item 20) and flat washers (Figure 1, Item 21).

9. Install exhaust pipe cap (Figure 1, Item 2) and tighten nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secure exhaust pipe cap (Figure 1, Item 2).

10. Start Genset (Figure 1, Items 12) in accordance with Genset Start Procedure (WP 0005) of this TM. Run for 15 minutes until operational temperature.

WARNING

Do not remove radiator cap until coolant temperature is below its boiling point. Radiator can erupt and cause severe burns. Once cooling has occurred, loosen cap slightly to relieve any excess pressure before removing the cap completely. Failure to observe this warning can result in severe injury to personnel.

11. Check Genset coolant levels. Coolant should be one inch below the overflow level. Bottle should be 1/3 to 1/2 when cool.

12. Replace front and rear access panels (Figure 1, Items 14 and 18) on Genset (Figure 1, Item 12).

13. Install cargo restraints (not shown) to rear of Genset.

14. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

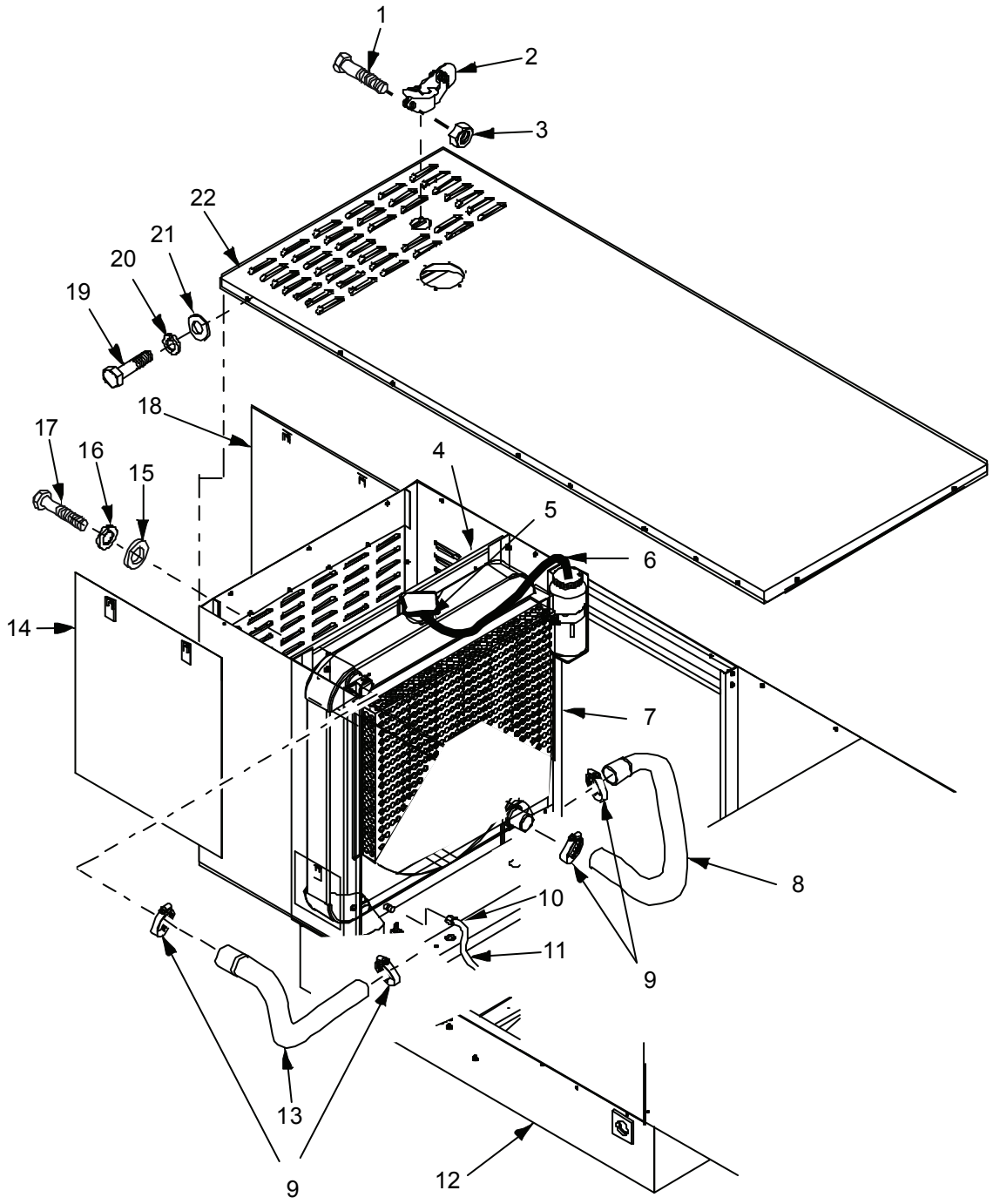

Figure 1. Radiator, Hoses, and Clamps Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET ALTERNATOR

GENERAL

This work package provides information on the services, adjustments removal and replacement of the Genset alternator.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

ALTERNATOR REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Alternator

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset (Figure 1, Item 1).
3. Remove the front access panel (Figure 1, Item 2) on Genset (Figure 1, Item 1) and set aside.
4. Remove rear access panel (not shown) and disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
5. Loosen but do not remove bottom mounting bolt (Figure 1, Item 12) and nut (Figure 1, Item 10).
6. Loosen but do not remove alignment bolt (Figure 1, Item 14) on alternator bracket (Figure 1, Item 15).
7. Loosen but do not remove hinge bolt (Figure 1, Item 16) on alternator bracket (Figure 1, Item 15).
8. Push alternator (Figure 1, Item 11) towards engine and loosen fan belt (Figure 1, Item 13).
9. Remove and retain nut (Figure 1, Item 3), lock washer (Figure 1, Item 4) and wire (Figure 1, Item 5) from main output stud on alternator (Figure 1, Item 11). Re-install nut (Figure 1, Item 3), lock washer (Figure 1,Item 4).
10. Disconnect wire terminal (Figure 1, Item 9) from alternator (Figure 1, Item 11).
11. Remove and retain nut (Figure 1, Item 6), lock washer (Figure 1, Item 7) and ground wire (Figure 1, Item 8) from ground stud on alternator (Figure 1, Item 11). Re-install nut (Figure 1, Item 6) and lock washer (Figure 1, Item 7).

REMOVAL – Continued

12. Remove and retain bottom mounting bolt (Figure 1, Item 12) and nut (Figure 1, Item 10).

13. Remove and retain top mounting bolt (Figure 1, Item 14).

14. Remove alternator (Figure 1, Item 11) from guides in the engine block.

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following step, inspect ground wire (Figure 1, Item 8) wire terminal (Figure 1, Item 9), and wire (Figure 1, Item 5) for connectivity. Ensure that wires have not become brittle and that there are no nicks, cuts or other damage to wire.

1. Insert alternator (Figure 1, Item 11) onto guides in the engine block.

2. Align bottom bolt hole of alternator (Figure 1, Item 11) with corresponding hole on engine block.

3. Insert bottom mounting bolt (Figure 1, Item 12) and nut (Figure 1, Item 10) and tighten until touching engine mount. Leave slack in bolt to allow movement.

4. Rotate alternator (Figure 1, Item 11) into the up position. Align bolt hole with groove in adjusting slide.

5. Insert alignment bolt (Figure 1, Item 14) through adjusting groove and alternator. Finger tighten.

NOTE

Fan belt should have no more than 0.3~0.33 in. (7.5~8.5 mm) of play when flexed on longest side.

6. Install fan belt (Figure 1, Item 13) and perform adjustment procedure.

7. Using torque wrench, tighten bottom mounting bolt (Figure 1, Item 12) and nut (Figure 1, Item 10), alignment bolt (Figure 1, Item 14) to 14~21 ft./lb (19~28 n-m/1.9~2.9 kgf-m).

8. Using torque wrench, tighten alternator bracket hinge bolt (Figure 1, Item 16) to 25~34 ft./lb (34~46 n-m/3.5~4.7 kgf-m).

9. Connect ground wire (Figure 1, Item 8) (green with looped connector) to ground stud on alternator (Figure 1, Item 11) and secure with nut (Figure 1, Item 6) and lock washer (Figure 1, Item 7)

10. Connect wire (Figure 1, Item 5) (loop connector) to main output stud on alternator (Figure 1, Item 11) and secure with nut (Figure 1, Item 3) and lock washer (Figure 1, Item 4).

11. Connect wire terminal (Figure 1, Item 9) to alternator (Figure 1, Item 11).

12. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM) and install rear access panel (not shown).

REPLACEMENT - Continued

13. Install front access panel (Figure 1, Item 2) on Genset (Figure 1, Item 1) and set aside.
14. Install cargo restraints (not shown).
15. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

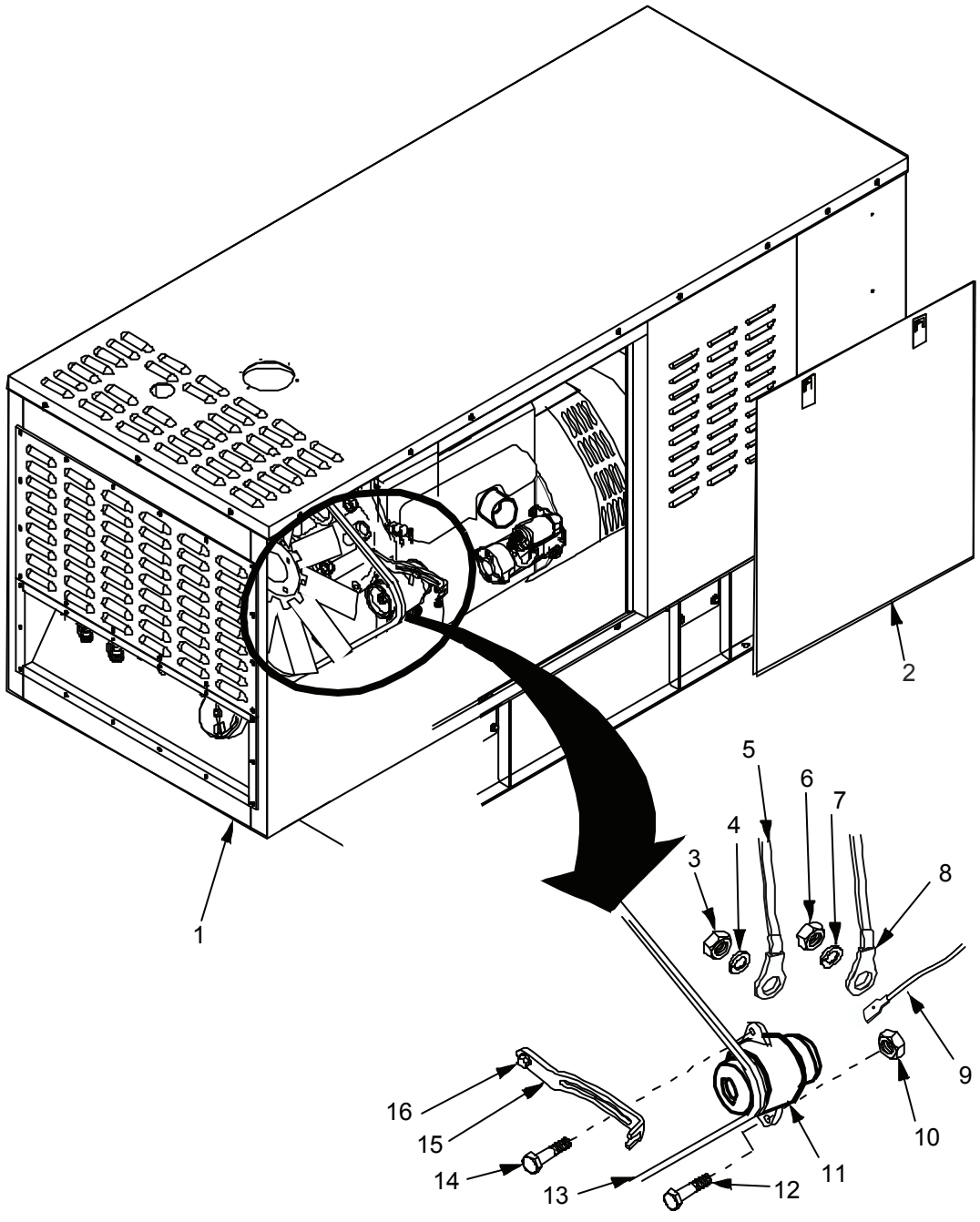

Figure 1. Alternator Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET FAN BELT

GENERAL

This work package provides information on the inspection, adjustment, removal and replacement of the Genset fan belt. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

FAN BELT INSPECTION/ADJUSTMENT/REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Fan belt

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

INSPECTION

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove the front access panel (Figure 1, Item 3) on Genset (Figure 1, Item 1) and set aside.
3. Inspect fan belt (Figure 1, Item 11) for excessive wear, nicks, cuts or other visible damage. Fan belt (Figure 1, Item 11) should be flush with pulleys on water pump and alternator (Figure 1, Item 8). If fan belt (Figure 1, Item 11) is not flush with top of groove in each pulley, replace fan belt (Figure 1, Item 11).
4. Check fan belt (Figure 1, Item 11) for deflection. When flexed, no more than 0.3~0.33 in. (7.5 mm ~8.5 mm) deflection on longest side of engine fan belt (Figure 1, Item 11) should be present.
5. Replace front access panel (Figure 1, Item 3) on Genset (Figure 1, Item 1).
6. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

ADJUSTMENT

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove the front access panel (Figure 1, Item 3) on Genset (Figure 1, Item 1) and set aside.

ADJUSTMENT – Continued

3. Loosen but do not remove bottom mounting bolt (Figure 1, Item 10) and nut (Figure 1, Item 9) of alternator (Figure 1, Item 8).

4. Loosen but do not remove adjustment bolt (Figure 1, Item 7) on alternator bracket (Figure 1, Item 6).

CAUTION

Do not over tighten fan belt. This could cause undo stress and excessive wear on fan belt, alternator and pulley. When flexed, no more than 0.3~0.33 in. (7.5 mm ~8.5 mm) deflection on longest side of engine fan belt (Figure 1, Item 11) should be present.

5. To tighten fan belt (Figure 1, Item 11) as follows:
   a. Place pry bar between the alternator (Figure 1, Item 8) and water pump (Figure 1, Item 2).
   b. Apply a downward force (towards alternator) on the pry bar to achieve proper tension on fan belt.

NOTE

Keep tension on alternator (Figure 1, Item 8) with pry bar while performing the following two steps.

6. Tighten bottom mounting bolt (Figure 1, Item 10) and nut (Figure 1, Item 9) of alternator (Figure 1, Item 8).

7. Tighten adjustment bolt (Figure 1, Item 7) on alternator bracket (Figure 1, Item 6).

8. Replace front access panel (Figure 1, Item 3) on Genset (Figure 1, Item 1).

9. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

REMOVAL

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove the front access panel (Figure 1, Item 3) on Genset (Figure 1, Item 1) and set aside.

3. Remove rear access panel (not shown) and disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

4. Loosen but do not remove bottom mounting bolt (Figure 1, Item 10) and nut (Figure 1, Item 9) of alternator (Figure 1, Item 8).

5. Loosen but do not remove adjustment bolt (Figure 1, Item 7) on alternator bracket (Figure 1, Item 6).

6. Push alternator (Figure 1, Item 8) towards engine to loosen fan belt (Figure 1, Item 11).

7. Remove fan belt (Figure 1, Item 11) from alternator (Figure 1, Item 8), crank shaft pulley (Figure 1, Item 4) and water pump (Figure 1, Item 2) and place onto fan neck.

REMOVAL – Continued

WARNING

If Genset has been in operation, fluid and components may be extremely hot. Be cautious of radiator and associated hoses.

8. Push fan belt (Figure 1, Item 11) into fan shroud and slide fan belt (Figure 1, Item 11) under lowest fan blade.

9. Rotate the fan blades (Figure 1, Item 5), sliding fan belt (Figure 1, Item 11) under each fan blade (Figure 1, Item 5) until fan belt (Figure 1, Item 11) is released.

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps:
- Inspect radiator for dents, holes, or leaks
- Inspect water pump (Figure 1, Item 2), crank shaft pulley (Figure 1, Item 4) and alternator (Figure 1, Item 8).
- Inspect fan blade assembly for damage corrosion or other signs that would indicate replacement is necessary.

1. Insert fan belt (Figure 1, Item 11) into fan shroud to allow fan belt (Figure 1, Item 11) to fit over fan blade.

2. While rotating fan blades (Figure 1, Item 5), slide fan belt (Figure 1, Item 11) under fan blades (Figure 1, Item 5) until fan belt (Figure 1, Item 11) is around fan neck.

3. Mount fan belt (Figure 1, Item 11) onto grooves of water pump (Figure 1, Item 2) and crank shaft pulley (Figure 1, Item 4).

4. Mount fan belt (Figure 1, Item 11) onto alternator (Figure 1, Item 8).

CAUTION

Do not over tighten fan belt. This could cause undo stress and excessive wear on fan belt, alternator and pulley. Fan belt should have no more than 0.3~0.33 in. (7.5~8.5 mm) of play when flexed on longest side.

5. Perform adjustment procedure as described in this WP.

6. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM) and install rear access panel (not shown).

7. Replace front access panel (Figure 1, Item 3) on Genset (Figure 1, Item 1).

8. Install cargo restraints (not shown) to rear of Genset.

9. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

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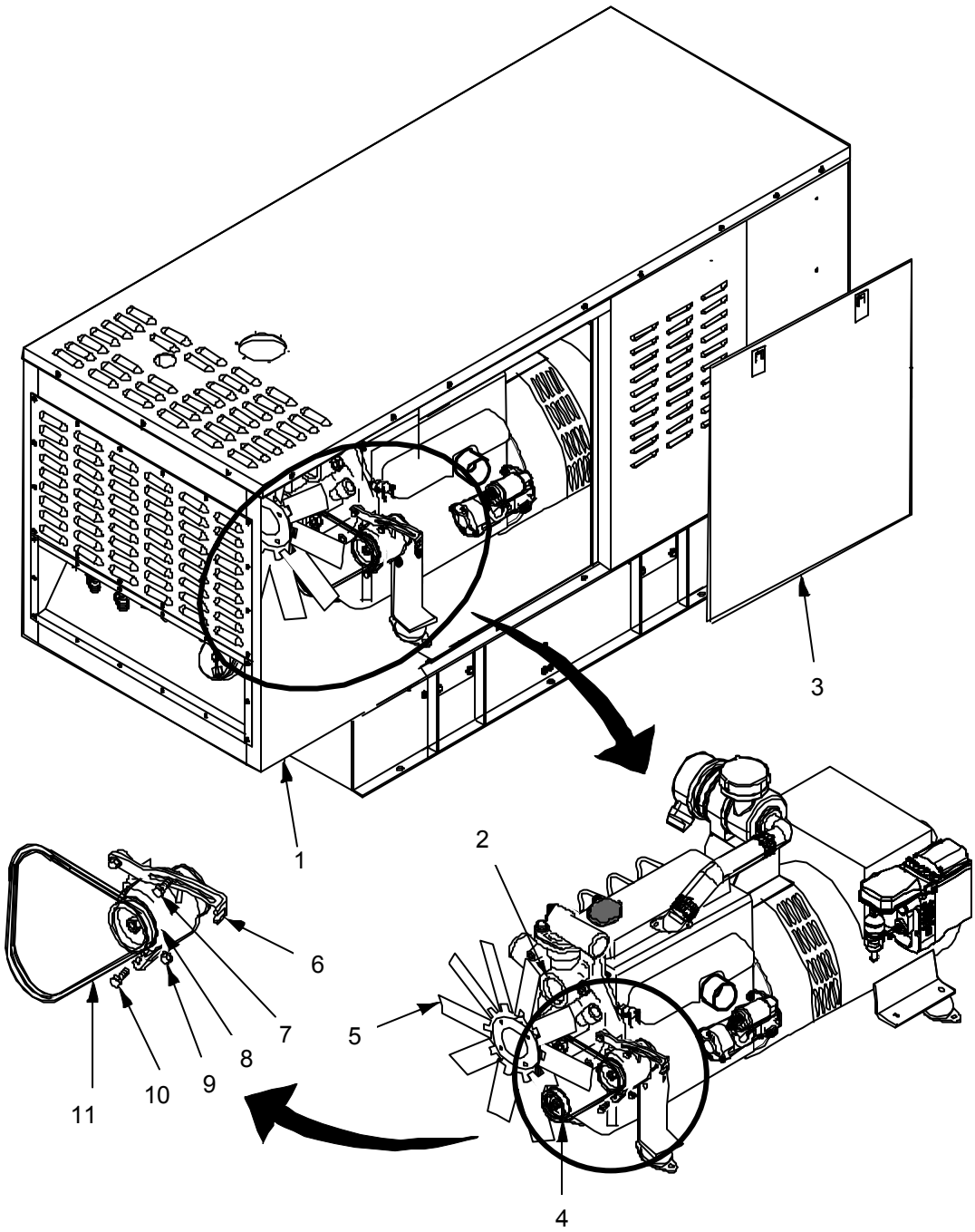


Figure 1. Fan Belt Adjustment, Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET FAN

GENERAL

This work package provides information on the removal and replacement of the Genset fan. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

FAN REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses
Drain pan

Materials/Parts
Fan
Sealing compound (WP 0168, Item 50)
Coolant (WP 0168, Item 2)
Strap ties (WP 0168, Item 55 to 57)
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

References
WP 0005, WP 0041
WP 0058 – WP 0061

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 1, Item 11) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Start Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset (Figure 1, Item 11).

3. Remove the front and rear access panels (Figure 1, Items 9 and 22) on Genset (Figure 1, Item 11) and set aside.

4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

5. Loosen but do not remove nut (Figure 1, Item 7) and bolt (Figure 1, Item 5) that secures exhaust pipe cap (Figure 1, Item 6). Remove exhaust pipe cap (Figure 1, Item 6) and set aside.

6. Remove and retain 20 bolts (Figure 1, Item 19), lock washers (Figure 1, Item 20), and flat washers (Figure 1, Item 21) that secure top access panel (Figure 1, Item 8) to Genset (Figure 1, Item 11). Remove top access panel (Figure 1, Item 8) and set aside.

7. Drain coolant from radiator, as described in (WP 0058).

REMOVAL – Continued

NOTE

Place towels or pads below radiator to absorb any excess fluid.

8. Remove top radiator hose as described in (WP 0058).

9. Remove strap ties that secure radiator over flow tube (Figure 1, Item 4) to fan shroud (Figure 1, Item 2).

10. Remove radiator overflow tube (Figure 1, Item 4) from radiator cap (Figure 1, Item 3) and set aside.

11. Remove and retain eight bolts (Figure 1, Item 1) that secure fan shroud (Figure 1, Item 2) and slide fan shroud (Figure 1, Item 2) back to give access to the engine fan (Figure 1, Item 15).

NOTE

If necessary, loosen alternator (Figure 1, Item 10) and release tension on fan belt (Figure 1, Item 12) as described in (WP 0060).

12. Remove and retain four bolts (Figure 1, Item 14) that secure engine fan (Figure 1, Item 15), spacer (Figure 1, Item 16), and spacer sleeve (Figure 1, Item 17) to pulley assembly (Figure 1, Item 13).

13. Remove two bolts (Figure 1, Item 13) that secure pulley assembly (Figure 1, Item 18) to alternator (Figure 1, Item 10).

14. Remove engine fan (Figure 1, Item 15), outer fan shroud (Figure 1, Item 2), spacer (Figure 1, Item 16), and spacer sleeve (Figure 1, Item 17).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following step:

- Inspect radiator for dents, holes, or leaks.
- Inspect radiator hoses for cracks, swelling, or other obvious deterioration.
- Inspect hose clamps. Verify that clamps are secure and that no damage or other obvious deterioration is present.

If outer fan shroud (Figure 1, Item 2) was removed from the Genset enclosure, place outer fan shroud (Figure 1, Item 2) in position over pulley assembly (Figure 1, Item 18).

1. If removed, install pulley assembly (Figure 1, Item 18) onto alternator (Figure 1, Item 10) and secure with two bolts (Figure 1, Item 13).

2. Install engine fan (Figure 1, Item 15), spacer (Figure 1, Item 16), and spacer sleeve (Figure 1, Item 17) onto pulley assembly (Figure 1, Item 18).

REPLACEMENT – Continued

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well ventilated area. If adhesive, solvent, or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

3. Apply sealing compound to four bolts (Figure 1, Item 14). Secure engine fan (Figure 1, Item 15), spacer (Figure 1, Item 16), and spacer sleeve (Figure 1, Item 17) to pulley assembly (Figure 1, Item 18) with four bolts (Figure 1, Item 14).
4. Using torque wrench, tighten four bolts (Figure 1, Item 14) of engine fan (Figure 1, Item 15) to 17.4 ft./lb (23.5 n-m/2.4 kgf-m).
5. Install outer fan shroud (Figure 1, Item 2) and secure to radiator with eight bolts (Figure 1, Item 1).
6. Install radiator overflow tube (Figure 1, Item 4) and radiator cap (Figure 1, Item 3). Attach radiator overflow tube (Figure 1, Item 4) to outer fan shroud (Figure 1, Item 2) with strap ties.
7. Replace engine fan belt (Figure 1, Item 12) and adjust tension as described in (WP 0061).
8. Replace the upper radiator hose as described in (WP 0058).
9. Refill the radiator with coolant as described in (WP 0059).
10. Install top access panel (Figure 1, Item 8) and secure using 20 bolts (Figure 1, Item 19), lock washers (Figure 1, Item 20), and flat washers (Figure 1, Item 21).
11. Install exhaust pipe cap (Figure 1, Item 6) and tighten nut (Figure 1, Item 7) and bolt (Figure 1, Item 5).
12. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
13. Install front and rear access panels (Figure 1, Items 9 and 22) onto Genset (Figure 1, Item 11).
14. Install cargo restraints (not shown).
15. Start Genset (Figure 1, Item 11) in accordance with Genset Start Procedure (WP 0005) of this TM.

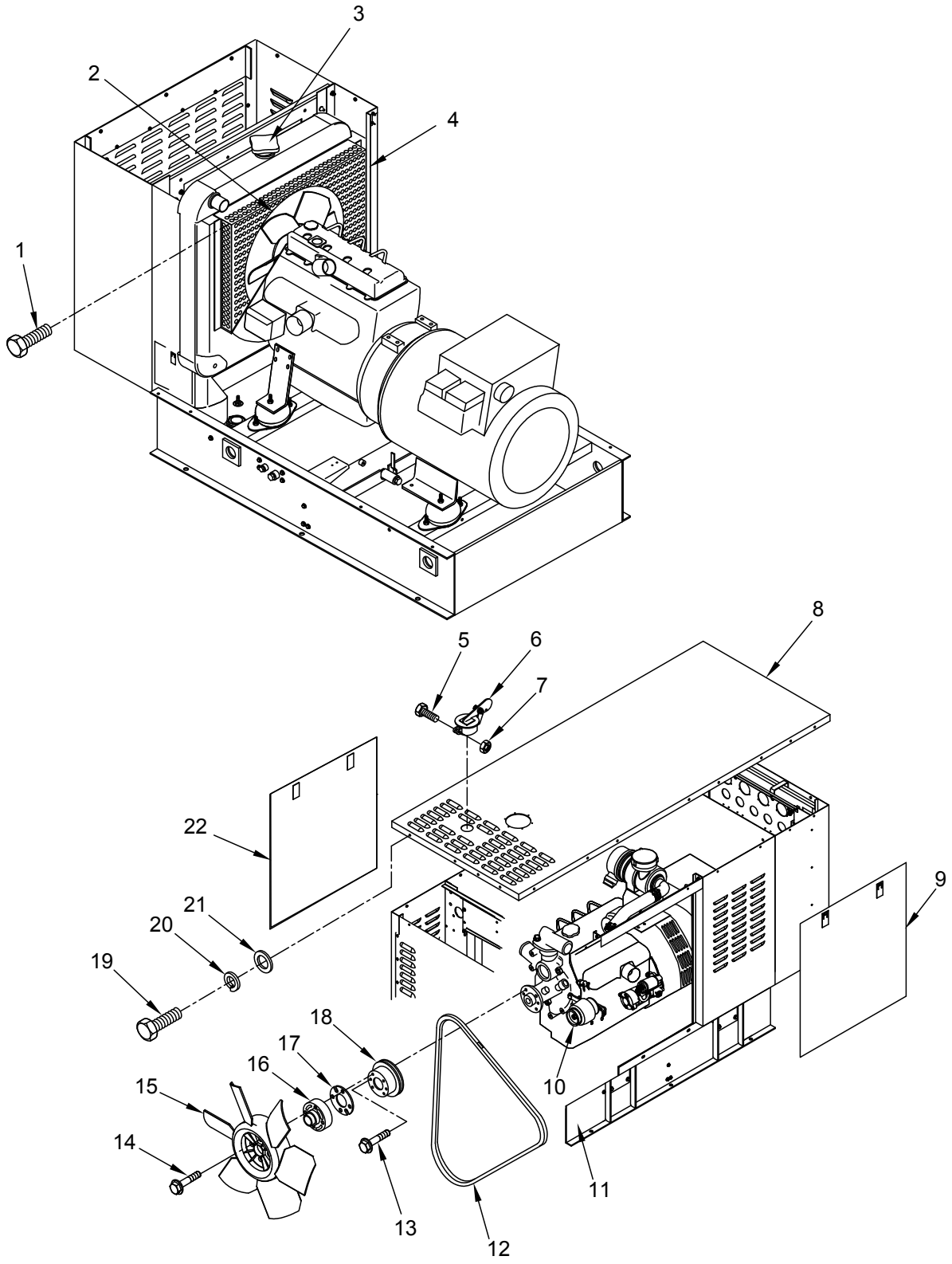


Figure 1. Fan Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET WATER PUMP

GENERAL

This work package provides information on the removal and replacement of the Genset engine water pump. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

WATER PUMP REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Water pump
Gasket
Abrasive mesh cloth (WP 0168, Item 13)
Cloth, cleaning (WP 0168, Item 14)
Gasket sealant (WP 0168, Item 49)

Personnel Required
One

References
WP 0005, WP 0041,
WP 0057 – WP 0060,
WP 0062

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 1, Item 20) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.

3. Remove the front and rear access panels (Figure 1, Items 5 and 21) on Genset (Figure 1, Item 20) and set aside.

4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

5. Loosen but do not remove nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secures exhaust pipe cap (Figure 1, Item 2). Remove exhaust pipe cap (Figure 1, Item 2) and set aside.

6. Remove and retain 20 bolts (Figure 1, Item 22), lock washers (Figure 1, Item 23), and flat washers (Figure 1, Item 24) that secure top access panel (Figure 1, Item 4) to Genset (Figure 1, Item 20). Remove top access panel (Figure 1, Item 4) and set aside.

7. Drain engine coolant as describe in (WP 0058).

NOTE

Place towels or pads below radiator to absorb any excess fluid.

REMOVAL – Continued

8. Remove two clamps (Figure 1, Items 7 and 13) and coolant hoses (Figure 1, Items 6 and 12) from water pump (Figure 1, Item 14) and thermostat (Figure 1, Item 8).
9. Remove top radiator hose as describe in (WP 0059).
10. Remove thermostat (Figure 1, Item 8) as describe in (WP 0057).
11. Loosen alternator (Figure 1, Item 17) as describe in (WP 0060).
12. Remove cooling fan (Figure 1, Item 19) and fan belt (Figure 1, Item 16) as describe in (WP 0062).

NOTE

Water pump bolts are different sizes. Attempting to mount water pump with bolts in incorrect positions could result in damage to bolts or failure of water pump seal. Note which holes each bolt came from.

13. Remove and retain five bolts (Figure 1, Item 15) from water pump (Figure 1, Item 14).
14. Remove and retain two nuts (Figure 1, Item 18) from water pump alignment studs (Figure 1, Item 11).
15. Tap on water pump (Figure 1, Item 14) to break seal and pry away from engine block (Figure 1, Item 10).
16. Discard water pump (Figure 1, Item 14).
17. Remove water pump gasket (Figure 1, Item 9).

END OF TASK

REPLACEMENT

CAUTION

When performing the following step, do not damage the water pump or thermostat housing.

1. Scrape off old gasket material from engine block (Figure 1, Item 10). If necessary, clean area with abrasive mesh cloth to remove all residue.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

2. Apply thin layer of gasket sealant to mating surfaces on water pump (Figure 1, Item 14) and engine block (Figure 1, Item 10)
3. Attach new water pump gasket (Figure 1, Item 9) to water pump (Figure 1, Item 14).

REPLACEMENT – Continued

NOTE

Water pump bolts (Figure 1, Item 15) are different sizes. Attempting to mount water pump with bolts in incorrect positions could result in damage to bolts or failure of water pump seal.

4. Place five bolts (Figure 1, Item 15) through appropriate holes of water pump (Figure 1, Item 14) and gasket (Figure 1, Item 9).

NOTE

Gasket (Figure 1, Item 9) should hold bolts (Figure 1, Item 15) in position during alignment of the water pump (Figure 1, Item 14).

5. Align the water pump (Figure 1, Item 14) alignment studs (Figure 1, Item 11) on the engine block (Figure 1, Item 10) and insert water pump (Figure 1, Item 14) onto alignment studs (Figure 1, Item 11).

6. Tighten five bolts (Figure 1, Item 15) finger tight.

7. Install two nuts (Figure 1, Item 18) onto alignment studs (Figure 1, Item 11) and finger tighten.

NOTE

When performing the following step, tighten five bolts (Figure 1, Item 15) and two nuts (Figure 1, Item 18) using a cross pattern to ensure a good seat (i.e. tighten a bolt first on one side, than the opposite. Work your way around the water pump).

8. Using torque wrench, tighten two nuts (Figure 1, Item 18) and five bolts (Figure 1, Item 15) to 14~21 ft./lb (19~28 n-m/1.9~2.9 kgf-m).

9. Install cooling fan (Figure 1, Item 19) and fan belt (Figure 1, Item 16) as describe in (WP 0062).

10. Install thermostat (Figure 1, Item 8) as describe in (WP 0057).

11. Install alternator (Figure 1, Item 17) as describe in (WP 0060).

NOTE

Ensure that clamps (Figure 1, Items 7 and 13) are present on coolant hoses (Figure 1, Items 6 and 12) before performing the next step.

12. Install two coolant hoses (Figure 1, Items 6 and 12) onto water pump (Figure 1, Item 14) and thermostat (Figure 1, Item 8) and secure using two clamps (Figure 1, Items 7 and 13).

13. Install top radiator hose as describe in (WP 0059).

14. Replace engine coolant as describe in (WP 0058).

15. Install top access panel (Figure 1, Item 4) onto Genset (Figure 1, Item 20) and secure using 20 bolts (Figure 1, Item 22), lock washers (Figure 1, Item 23) and flat washers (Figure 1, Item 24).

REPLACEMENT – Continued

16. Install exhaust pipe cap (Figure 1, Item 2) and tighten nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secure exhaust pipe cap (Figure 1, Item 2).

17. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

18. Replace front and rear access panels (Figure 1, Items 5 and 21) on Genset (Figure 1, Item 20).

19. Install cargo restraints (not shown).

20. Start Genset (Figure 1, Items 20) in accordance with Genset Start Procedure (WP 0005) of this TM.

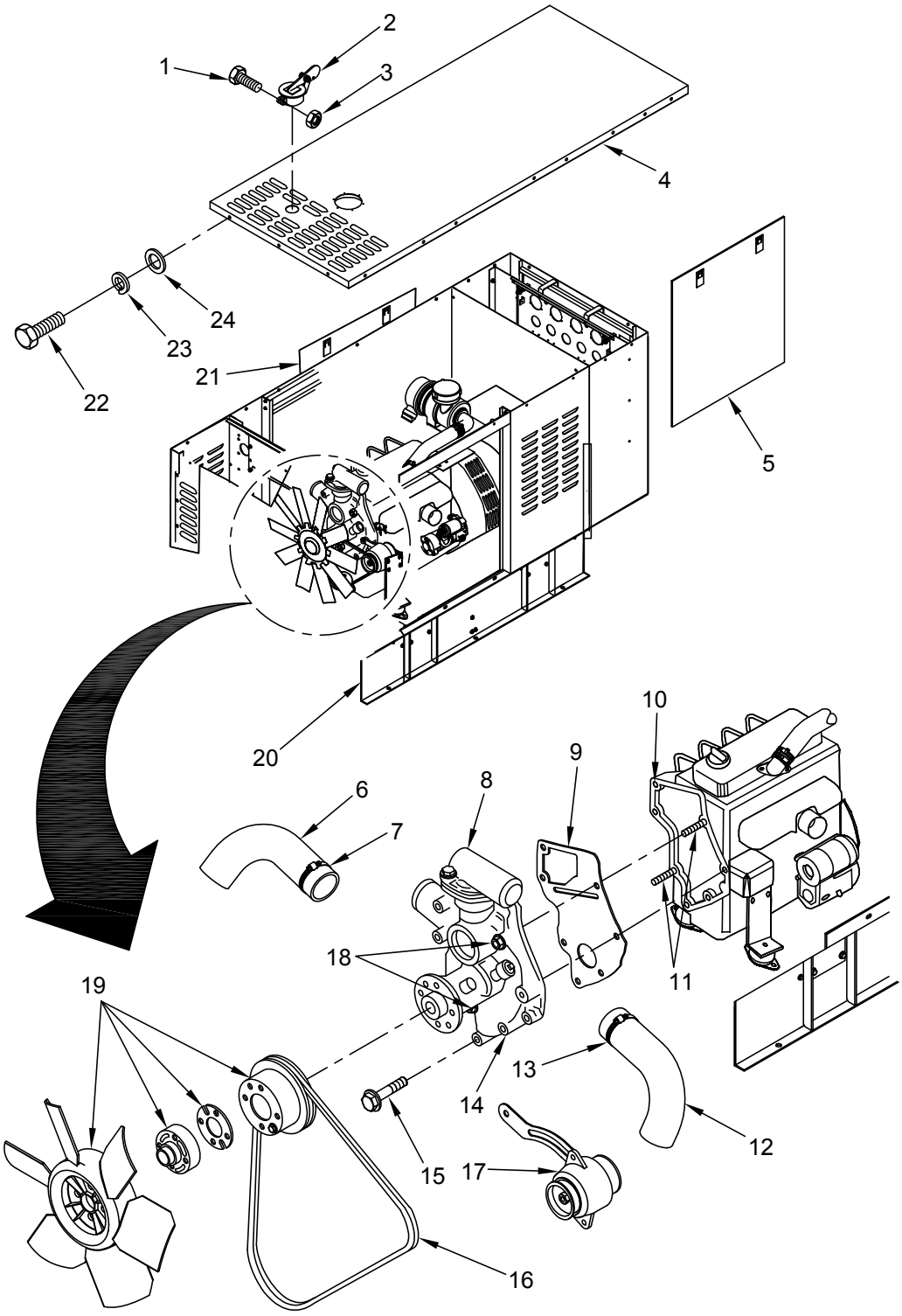


Figure 1. Water Pump Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET ENGINE HEATER (HYDRONIC)

GENERAL

This work package provides information on the service and removal/replacement of the Genset engine heater (hydronic). It consists of:

- Engine heater (hydronic) removal/replacement
- Engine heater (hydronic) fuel pump and fuel filter removal/replacement
- Engine heater (hydronic) fuse removal/replacement
- Engine heater (hydronic) hoses removal/replacement

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

ENGINE HEATER (HYDRONIC) REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses
Rubber gloves (WP 0168, Item 24)

Materials/Parts
Engine heater (hydronic)
Cloth, cleaning (WP 0168, Item 14)
Drain pan

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

REMOVAL

1. Verify that Genset (Figure 1, Item 26) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Loosen but do not remove nut (Figure 1, Item 4) and bolt (Figure 1, Item 2) that secures exhaust pipe cap (Figure 1, Item 3). Remove exhaust pipe cap (Figure 1, Item 3) and set aside.
4. Remove and retain 20 bolts (Figure 1, Item 28), lock washers (Figure 1, Item 29) and flat washers (Figure 1, Item 30) that secure top access panel (Figure 1, Item 1) to Genset (Figure 1, Item 26). Remove top access panel (Figure 1, Item 1) and set aside.
5. Remove front access panel (Figure 1, Item 5) and set aside.
6. Remove rear access panel (Figure 1, Item 27) and set aside.
7. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

REMOVAL – Continued

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

8. Loosen hose clamp (Figure 1, Item 21) on engine heater (hydronic) fuel line (Figure 1, Item 18) at the fuel pump (Figure 1, Item 17) and disconnect fuel line (Figure 1, Item 18). Guide fuel line (Figure 1, Item 18) to spill bucket and allow fuel to drain out of system.

9. Loosen clamp (Figure 1, Item 20) that secures cool fluid input hose (Figure 1, Item 19) on the heater body (Figure 1, Item 14) and disconnect cool fluid input hose (Figure 1, Item 19).

10. Loosen clamp (Figure 1, Item 22) that secures fresh air intake hose (Figure 1, Item 23). Remove the fresh air intake hose (Figure 1, Item 23) from engine heater (hydronic) body (Figure 1, Item 14).

11. Loosen clamp (Figure 1, Item 25) that secures hot output hose (Figure 1, Item 24) to the heater body (Figure 1, Item 14). Remove hot output hose (Figure 1, Item 24) from engine heater (hydronic) body (Figure 1, Item 14).

12. Loosen clamp (Figure 1, Item 15) that secures exhaust hose (Figure 1, Item 16) to the heater body (Figure 1, Item 14). Remove the exhaust hose (Figure 1, Item 16) from engine heater (hydronic) body (Figure 1, Item 14).

13. Remove engine heater (hydronic) wiring harness access cover by carefully prying out on side of cover.

14. Remove engine heater (hydronic) external wiring harness connectors.

15. Loosen four bolts (Figure 1, Item 10) that secure generator cover (Figure 1, Item 6). Remove generator cover and set aside.

WARNING

High AC voltage (208 VAC) and amperage present at electrical connections. Do not enter if Genset is operational. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

16. Remove and retain three nuts (Figure 1, Item 8), two flat washers (Figure 1, Item 7) and one large flat washer (Figure 1, Item 9) that secure engine heater (hydronic) body (Figure 1, Item 14) to side panel.

17. Remove engine heater (hydronic) body (Figure 1, Item 14), three threaded studs (Figure 1, Item 13), spacers (Figure 1, Item 12) and flat washers (Figure 1, Item 11).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps:

- Inspect all clamps and hoses. Ensure that hoses are not damaged (cuts, nicks, etc.). Ensure that all hoses are not excessively worn or appear to be unserviceable. Ensure that clamps are in good working order.
- Inspect engine heater (hydronic) fuel filter. Ensure that fuel filter is not excessively dirty, worn or is in other need of servicing.
- Inspect engine heater (hydronic) fuel pump. Ensure that fuel pump is not excessively damaged or otherwise appears to be unserviceable.

1. Insert three spacers (Figure 1, Item 12) and flat washers (Figure 1, Item 11) onto threaded studs (Figure 1, Item 13) on engine heater (hydronic) body (Figure 1, Item 14).

2. Align engine heater (hydronic) body (Figure 1, Item 14) with proper holes on side panel and secure using two flat washers (Figure 1, Item 7) and one large flat washer (Figure 1, Item 9) and three nuts (Figure 1, Item 8).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

3. Connect engine heater (hydronic) fuel line (Figure 1, Item 18) from fuel pump (Figure 1, Item 17) to engine heater (hydronic) (Figure 1, Item 14). Secure with clamp (Figure 1, Item 21).

4. Connect cool fluid input hose (Figure 1, Item 19) to proper port on engine heater (hydronic) (Figure 1, Item 14) Secure with hose clamp (Figure 1, Item 20).

5. Connect fresh air intake hose (Figure 1, Item 23) to proper port on engine heater (hydronic) body (Figure 1, Item 14). Secure with clamp (Figure 1, Item 22).

6. Connect hot output hose (Figure 1, Item 24) to the engine heater (hydronic) body (Figure 1, Item 14). Secure with clamp (Figure 1, Item 25).

7. Connect exhaust hose (Figure 1, Item 16) to proper port on heater body (Figure 1, Item 14) and secure with clamp (Figure 1, Item 15).

8. Clean up any excess spillage from base of Genset.

9. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

10. Install generator cover (Figure 1, Item 6) and secure using four bolts (Figure 1, Item 10).

11. Connect engine heater (hydronic) external wiring harness and close access cover on engine heater (hydronic).

12. Install top access panel (Figure 1, Item 1) onto Genset (Figure 1, Item 26) and secure using 20 bolts (Figure 1, Item 28), lock washers (Figure 1, Item 29) and flat washers (Figure 1, Item 30).

13. Install exhaust pipe cap (Figure 1, Item 3) and tighten nut (Figure 1, Item 4) and bolt (Figure 1, Item 2) that secure exhaust pipe cap (Figure 1, Item 3).

REPLACEMENT - Continued

14. Install access panels (Figure 1, Items 5 and 27).

15. Install cargo restraints (not shown).

16. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

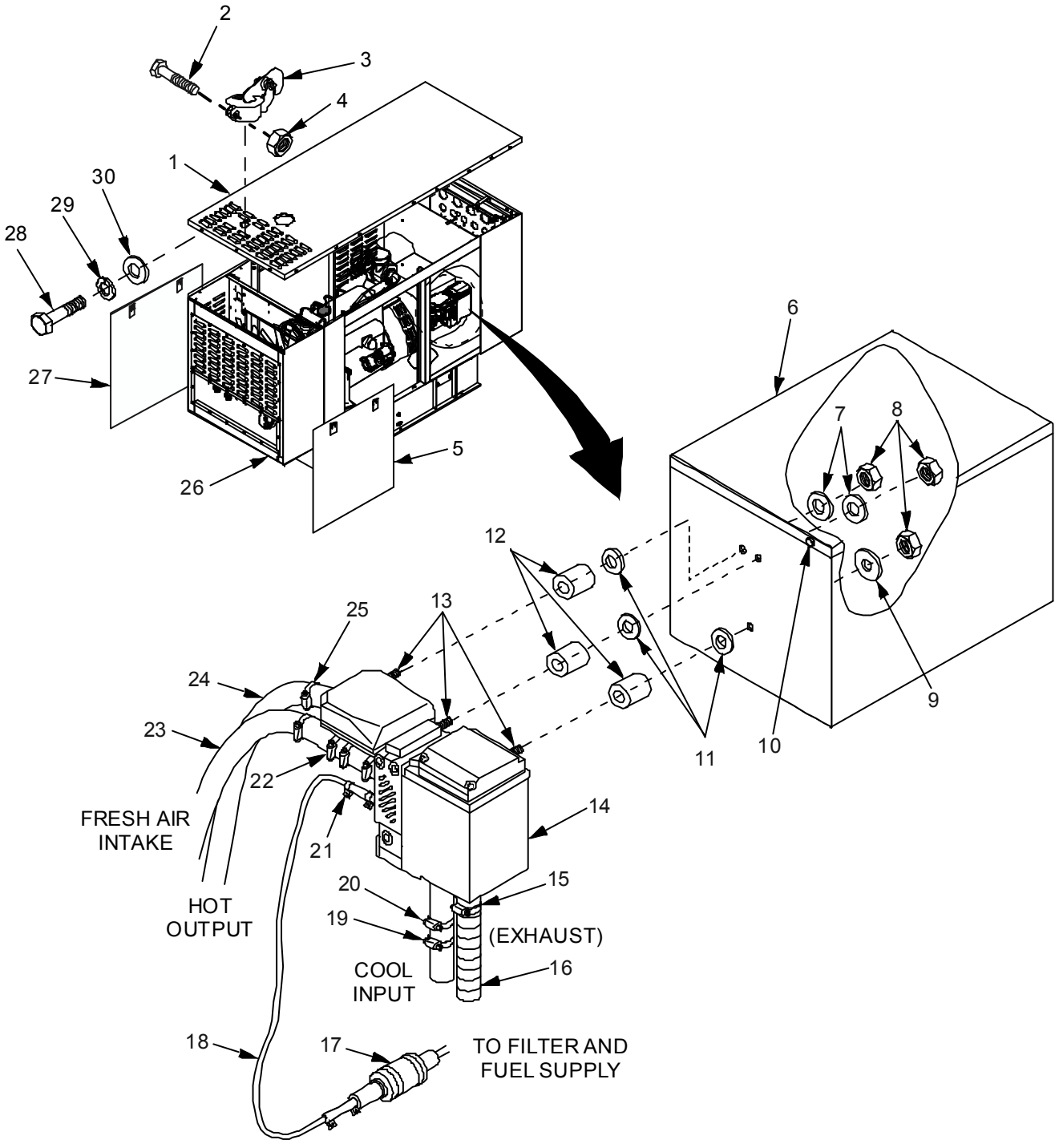


Figure 1. Engine Heater (Hydronic) Removal/Replacement.

END OF TASK

ENGINE HEATER (HYDRONIC) FUEL PUMP AND FUEL FILTER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Fuel pump
Fuel filter
Drain pan
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

References
WP 0005, WP 0041

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

FUEL PUMP

REMOVAL

1. Verify that Genset (Figure 2, Item 2) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.

3. Remove front and rear access panels (Figure 2, Items 1 and 3) of Genset (Figure 2, Item 2) and set aside.

4. Disconnect battery ground cable (black) from battery ground terminal (If necessary, refer to procedure in (WP 0041) of this TM).

5. Disconnect electrical cable (Figure 2, Item 6) from fuel pump (Figure 2, Item 11).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

6. Loosen hose clamp (Figure 2, Item 8) and disconnect fuel line (Figure 2, Item 7) (heater side) from fuel pump (Figure 2, Item 11). Guide fuel line (Figure 2, Item 7) to spill bucket and allow fuel to drain.

REMOVAL – Continued

7. Loosen second hose clamp (Figure 2, Item 12) and disconnect fuel line (Figure 2, Item 4) (filter side) from fuel pump (Figure 2, Item 11). Guide fuel line (Figure 2, Item 4) to spill bucket and allow fuel to drain.

8. Remove and retain bolt (Figure 2, Item 10) and flat washer (Figure 2, Item 9) that secures fuel pump (Figure 2, Item 11) and clamp (Figure 2, Item 5) to frame (Figure 2, Item 17).

9. Remove fuel pump (Figure 2, Item 11) and clamp (Figure 2, Item 5).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps:

- Inspect all clamps and hoses. Ensure that hoses are not damaged (cuts, nicks, etc.). Ensure that all hoses are not excessively worn or appear to be unserviceable. Ensure that clamps are in good working order.
- Inspect engine heater (hydronic) fuel filter. Ensure that fuel filter is not excessively dirty, worn or is in need of other servicing.

Verify that fuel pump (Figure 2, Item 11) is installed in the proper direction. Arrow should point towards fuel line going to engine heater (hydronic).

1. Install clamp (Figure 2, Item 5) onto fuel pump (Figure 2, Item 11). Secure assembly to frame (Figure 2, Item 17) with bolt (Figure 2, Item 10) and flat washer (Figure 2, Item 9).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

2. Connect fuel line (Figure 2, Item 4) (filter side) to fuel pump (Figure 2, Item 11) and secure with clamp (Figure 2, Item 12).

3. Connect fuel line (Figure 2, Item 7) (heater side) to fuel pump (Figure 2, Item 11) and secure with hose clamp (Figure 2, Item 8).

4. Connect electrical cable (Figure 2, Item 6) to fuel pump (Figure 2, Item 11).

5. Clean up any excess spillage from base of Genset (Figure 2, Item 2).

6. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

7. Install and secure front and rear access panels (Figure 2, Items 1 and 3).

8. Install cargo restraints (not shown).

9. Start Genset (Figure 2, Item 2) in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

FUEL FILTER

REMOVAL

1. Verify that Genset (Figure 2, Item 2) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.

3. Unlatch and remove front and rear access panels (Figure 2, Items 1 and 3) of Genset (Figure 2, Items 2) and set aside.

4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

5. Loosen hose clamp (Figure 2, Item 13) and disconnect fuel line (Figure 2, Item 4) (fuel pump side) from fuel filter (Figure 2, Item 14).

NOTE

When performing the following step do not let fuel line fall through frame.

6. Loosen second hose clamp (Figure 2, Item 15) and disconnect fuel line (Figure 2, Item 16) (fuel tank side) from fuel filter (Figure 2, Item 14).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps:

- Inspect all clamps and hoses. Ensure that hoses are not damaged (cuts, nicks, etc.). Ensure that all hoses are not excessively worn or appear to be unserviceable. Ensure that clamps are in good working order.

- Inspect Engine heater (hydronic) fuel pump. Ensure that fuel pump is not excessively damaged or otherwise appears to be unserviceable.

When performing the following steps verify that fuel filter (Figure 2, Item 14) is installed in the proper direction. Arrow should point towards fuel line going to engine heater (hydronic).

1. Connect fuel line (Figure 2, Item 16) (fuel tank side) to fuel filter (Figure 2, Item 14) and secure with hose clamp (Figure 2, Item 15).

REPLACEMENT

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

2. Connect fuel line (Figure 2, Item 4) (fuel pump side) to fuel filter (Figure 2, Item 14) and secure with hose clamp (Figure 2, Item 13).

3. Clean up any excess spillage from base of Genset.

4. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

5. Install and secure front and rear access panels (Figure 2, Items 1 and 3).

6. Install cargo restraints (not shown).

7. Start Genset (Figure 2, Item 2) in accordance with Genset Start Procedure (WP 0005) of this TM.

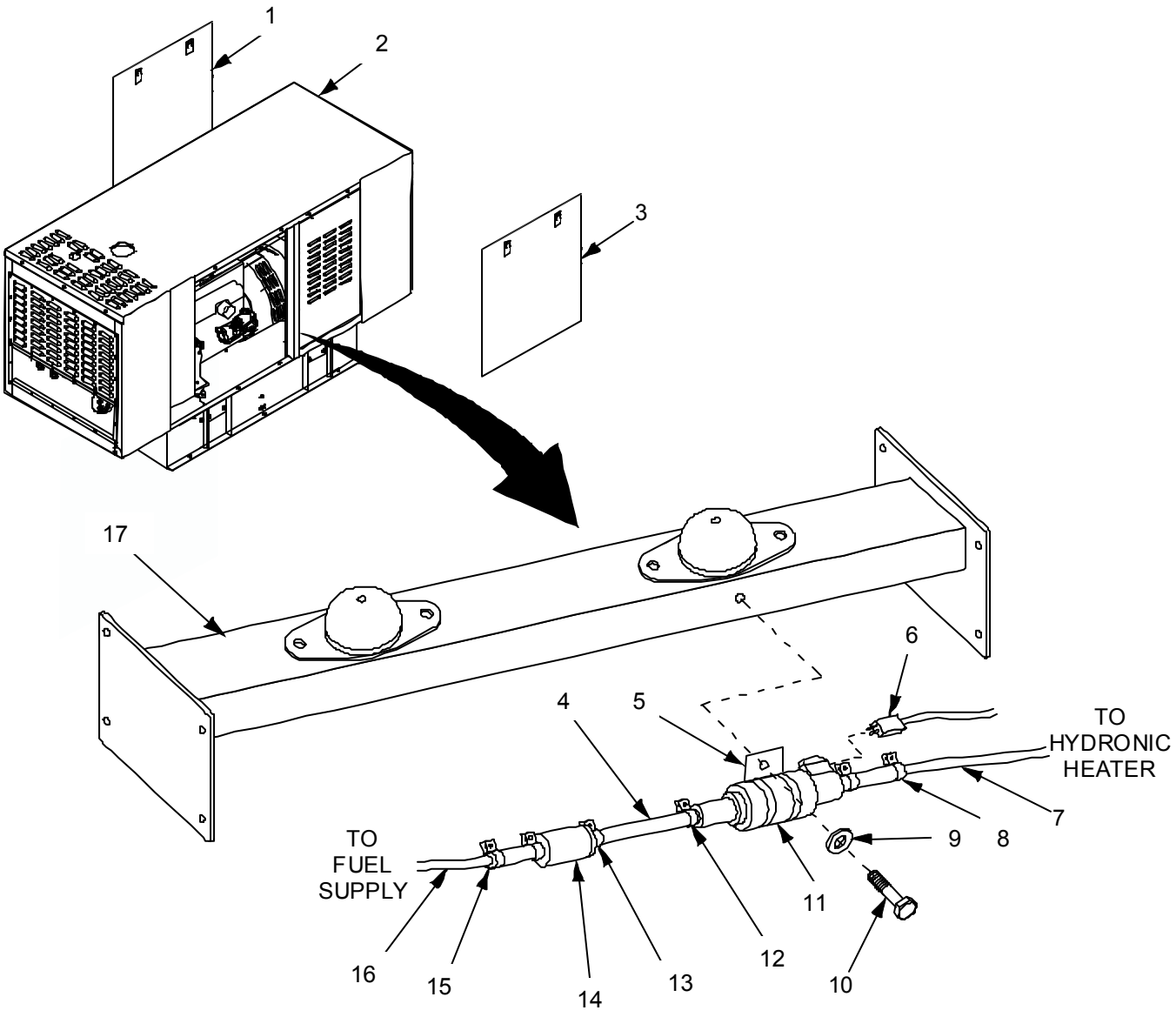


Figure 2. Engine Heater (Hydronic) Fuel Pump and Fuel Filter Removal/Replacement.

END OF TASK

ENGINE HEATER (HYDRONIC) HOSE REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Engine heater (hydronic) hoses
Drain pan
Cloth, cleaning (WP 0168, Item 14)
Strap, tie-down (WP 0168, Items 44 to 46)

Personnel Required
One

References
WP 0005, WP 0041, WP 0058

Equipment Condition
Genset shut down
BATTERY SWITCH – OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

REMOVAL (AIR INTAKE HOSE)

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Loosen but do not remove nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secures exhaust pipe cap (Figure 3, Item 6). Remove exhaust pipe cap (Figure 3, Item 6) and set aside.
4. Remove and retain 20 bolts (Figure 3, Item 1), lock washers (Figure 3, Item 2) and flat washers (Figure 3, Item 3) that secure top access panel (Figure 3, Item 4) to Genset (Figure 3, Item 20). Remove top access panel (Figure 3, Item 4) and set aside.
5. Remove front and rear access panels (Figure 3, Items 8 and 21) of Genset and set aside.
6. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

WARNING

Cut end of air intake is extremely sharp. Exercise care to prevent injury.

7. Cut zip ties that secure air intake hose, wiring harness and coolant hoses together.

REMOVAL (AIR INTAKE HOSE) – Continued

8. Loosen air intake hose clamp (Figure 3, Item 17) where it connects at the front of the engine heater (hydronic) (Figure 3, Item 10).

9. Grasp air intake hose (Figure 3, Item 18) and using a twisting motion pull away from the engine heater (hydronic) (Figure 3, Item 10).

10. Remove air intake hose from enclosure and set aside.

END OF TASK

REPLACEMENT (AIR INTAKE HOSE)

1. Position air intake hose (Figure 3, Item 18) so that cut end is located near air inlet on the engine heater (hydronic) (Figure 3, Item 10) and intake is pointed towards condenser coil on bottom of chamber.

2. Using a twisting motion slide the air intake hose (Figure 3, Item 18) over the intake port on the front of the engine heater (hydronic) (Figure 3, Item 10) approximately 1 inch.

3. Slide air intake hose clamp (Figure 3, Item 17) into position.

4. Tighten air intake hose clamp (Figure 3, Item 17).

5. Secure air intake hose, wiring harness and coolant hoses together with zip ties.

6. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

7. Install top access panel (Figure 3, Item 4) onto Genset (Figure 3, Item 20) and secure using 20 bolts (Figure 3, Item 1), lock washers (Figure 3, Item 2) and flat washers (Figure 3, Item 3).

8. Install exhaust pipe cap (Figure 3, Item 6) and tighten nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secure exhaust pipe cap (Figure 3, Item 6).

9. Install front and rear access panels (Figure 3, Items 8 and 21).

10. Install cargo restraints (not shown).

11. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

REMOVAL (EXHAUST HOSE)

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.

3. Loosen but do not remove nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secures exhaust pipe cap (Figure 3, Item 6). Remove exhaust pipe cap (Figure 3, Item 6) and set aside.

4. Remove and retain 20 bolts (Figure 3, Item 1), lock washers (Figure 3, Item 2) and flat washers (Figure 3, Item 3) that secure top access panel (Figure 3, Item 4) to Genset (Figure 3, Item 20). Remove top access panel (Figure 3, Item 4) and set aside.

REMOVAL (EXHAUST HOSE) – Continued

5. Remove front and rear access panels (Figure 3, Items 8 and 21) of Genset and set aside.

6. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

WARNING

If heater has been operating exhaust may be extremely hot. Allow time to cool before removing.

Cut end of exhaust is extremely sharp. Exercise care to prevent injury.

7. Loosen exhaust hose clamp (Figure 3, Item 11) at base of engine heater (hydronic) (Figure 3, Item 10).

8. Grasp exhaust hose (Figure 3, Item 12) and using a twisting motion pull down on hose.

9. Remove exhaust hose from enclosure and set aside.

END OF TASK

REPLACEMENT (EXHAUST HOSE)

1. Position exhaust hose (Figure 3, Item 12) so that its aligned with the exhaust port of the engine heater (hydronic) (Figure 3, Item 10).

2. Using a twisting motion slide the exhaust hose over exhaust port approximately 1 inch.

3. Slide exhaust hose clamp (Figure 3, Item 11) into position.

4. Tighten exhaust hose clamp.

5. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

6. Install top access panel (Figure 3, Item 4) onto Genset (Figure 3, Item 20) and secure using 20 bolts (Figure 3, Item 1), lock washers (Figure 3, Item 2) and flat washers (Figure 3, Item 3).

7. Install exhaust pipe cap (Figure 3, Item 6) and tighten nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secure exhaust pipe cap (Figure 3, Item 6).

8. Install front and rear access panels (Figure 3, Items 8 and 21).

9. Install cargo restraints (not shown).

10. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

REMOVAL (FUEL HOSE)

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.

REMOVAL (FUEL HOSE) – Continued

3. Loosen but do not remove nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secures exhaust pipe cap (Figure 3, Item 6). Remove exhaust pipe cap (Figure 3, Item 6) and set aside.

4. Remove and retain 20 bolts (Figure 3, Item 1), lock washers (Figure 3, Item 2) and flat washers (Figure 3, Item 3) that secure top access panel (Figure 3, Item 4) to Genset (Figure 3, Item 20). Remove top access panel (Figure 3, Item 4) and set aside.

5. Remove front and rear access panels (Figure 3, Items 8 and 21) of Genset and set aside.

6. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

7. Using either a flat tip screw driver or socket and ratchet, loosen the fuel hose clamp (Figure 3, Item 15) at the engine heater (hydronic) (Figure 3, Item 10). Repeat for other end of fuel hose.

8. Place a drip bucket or absorbent pad under the connection to be broken in case of spillage.

9. Grasp the fuel hose (Figure 3, Item 16) and rotate the hose close to the connection to break the connection.

10. Pull the fuel hose (Figure 3, Item 16) away from the connection using a twisting motion until it comes free. Repeat for other end of fuel hose.

11. Remove the fuel hose clamps if they are to be reused and discard hose.

END OF TASK

REPLACEMENT (FUEL HOSE)

NOTE

Ensure that replacement hose is the same length and diameter of the original hose.

Ensure that the hose clamps are placed on the hose in such a way that the screws will be accessible once slid into place.

1. Place hose clamps onto replacement hose loosely and slide to center of hose.

2. Most connections have a ridge built into them to facilitate a good seal when the hose clamp is tightened down. Identify the location of the ridge on the first side.

3. Using a twisting motion slide the fuel hose (Figure 3, Item 16) onto fuel port of engine heater (hydronic) (Figure 3, Item 10). Ensure hose is slid back far enough.

4. Slide fuel hose clamp (Figure 3, Item 15) into position. Repeat for other end of fuel hose.

5. Ensure hose is not twisted.

REPLACEMENT (FUEL HOSE) – Continued

6. Tighten down hose clamp (Figure 3, Item 15) using flat tip screwdriver or socket and ratchet, until hose clamp begins to press into hose. Repeat for other end of fuel hose.

NOTE

Over tightening the hose clamp can result in damage to the hose and premature failure.

7. Clean up any excess spillage from base of the Genset.

8. Connect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

9. Install top access panel (Figure 3, Item 4) onto Genset (Figure 3, Item 20) and secure using 20 bolts (Figure 3, Item 1), lock washers (Figure 3, Item 2) and flat washers (Figure 3, Item 3).

10. Install exhaust pipe cap (Figure 3, Item 6) and tighten nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secure exhaust pipe cap (Figure 3, Item 6).

11. Install front and rear access panels (Figure 3, Items 8 and 21).

12. Install cargo restraints (not shown).

13. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

REMOVAL (INPUT and OUTPUT COOLANT HOSE)

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.

3. Loosen but do not remove nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secures exhaust pipe cap (Figure 3, Item 6). Remove exhaust pipe cap (Figure 3, Item 6) and set aside.

4. Remove and retain 20 bolts (Figure 3, Item 1), lock washers (Figure 3, Item 2) and flat washers (Figure 3, Item 3) that secure top access panel (Figure 3, Item 4) to Genset (Figure 3, Item 20). Remove top access panel (Figure 3, Item 4) and set aside.

5. Remove front and rear access panels (Figure 3, Items 8 and 21) of Genset and set aside.

6. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

7. Identify coolant hose to be replaced (Figure 3, Item 13 or 19).

8. Drain engine coolant in accordance with (WP 0058) of this TM.

9. Cut zip ties that secure air intake hose, wiring harness and coolant hoses together.

10. Using either a flat tip screw driver or a socket and ratchet, loosen the coolant hose clamp (Figure 3, Item 13 or 14) on the engine heater (hydronic) (Figure 3, Item 10). Repeat for other end of coolant hose.

REMOVAL (INPUT and OUTPUT COOLANT HOSE) – Continued

11. Place a drip bucket or absorbent pad under the connection to be broken in case of spillage.

12. Grasp the coolant hose (Figure 3, Item 13 or 19) and rotate the hose close to the connection to break the connection.

13. Pull the coolant hose (Figure 3, Item 13 or 19) away from the connection using a twisting motion until it comes free. Repeat for other end of coolant hose.

14. Remove the hose clamps if they are to be reused and discard hose.

END OF TASK

REPLACEMENT (INPUT and OUTPUT COOLANT HOSE)

NOTE

Ensure that replacement hose is the same length and diameter of the original hose.

1. Place hose clamps onto replacement hose loosely and slide to center of hose.

NOTE

Ensure that the hose clamps are placed on the hose in such a way that the screws will be accessible once slid into place.

2. Most connections have a ridge built into them to facilitate a good seal when the hose clamp is tightened down. Identify the location of the ridge on the first side.

3. Using a twisting motion slide the coolant hose (Figure 3, Item 13 or 19) onto the coolant port of the engine heater (hydronic) (Figure 3, Item 10). Ensure hose is slid back far enough.

4. Slide coolant hose clamp (Figure 3, Item 9 or 14) down into position. Repeat for other end of hose.

5. Ensure hose is not twisted.

6. Tighten down hose clamps (Figure 3, Item 9 or 14) using flat tip screwdriver or socket and ratchet, until hose clamp begins to press into hose. Repeat for other end of coolant hose.

NOTE

Over tightening the hose clamp can result in damage to the coolant hose and premature failure.

7. Refill coolant in accordance with (WP 0058) of this TM.

8. Clean up any excess spillage from base of the Genset.

9. Secure air intake hose, wiring harness and coolant hoses together with zip ties.

10. Connect battery ground cable (black) to battery ground terminal (If necessary, refer to procedure in (WP 0041) of this TM).

11. Install top access panel (Figure 3, Item 4) onto Genset (Figure 3, Item 20) and secure using 20 bolts (Figure 3, Item 1), lock washers (Figure 3, Item 2) and flat washers (Figure 3, Item 3).

REPLACEMENT (INPUT and OUTPUT COOLANT HOSE) Continued

12. Install exhaust pipe cap (Figure 3, Item 6) and tighten nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secure exhaust pipe cap (Figure 3, Item 6).

13. Install and secure front and rear access panels (Figure 3, Items 8 and 21).

14. Install cargo restraints (not shown).

15. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

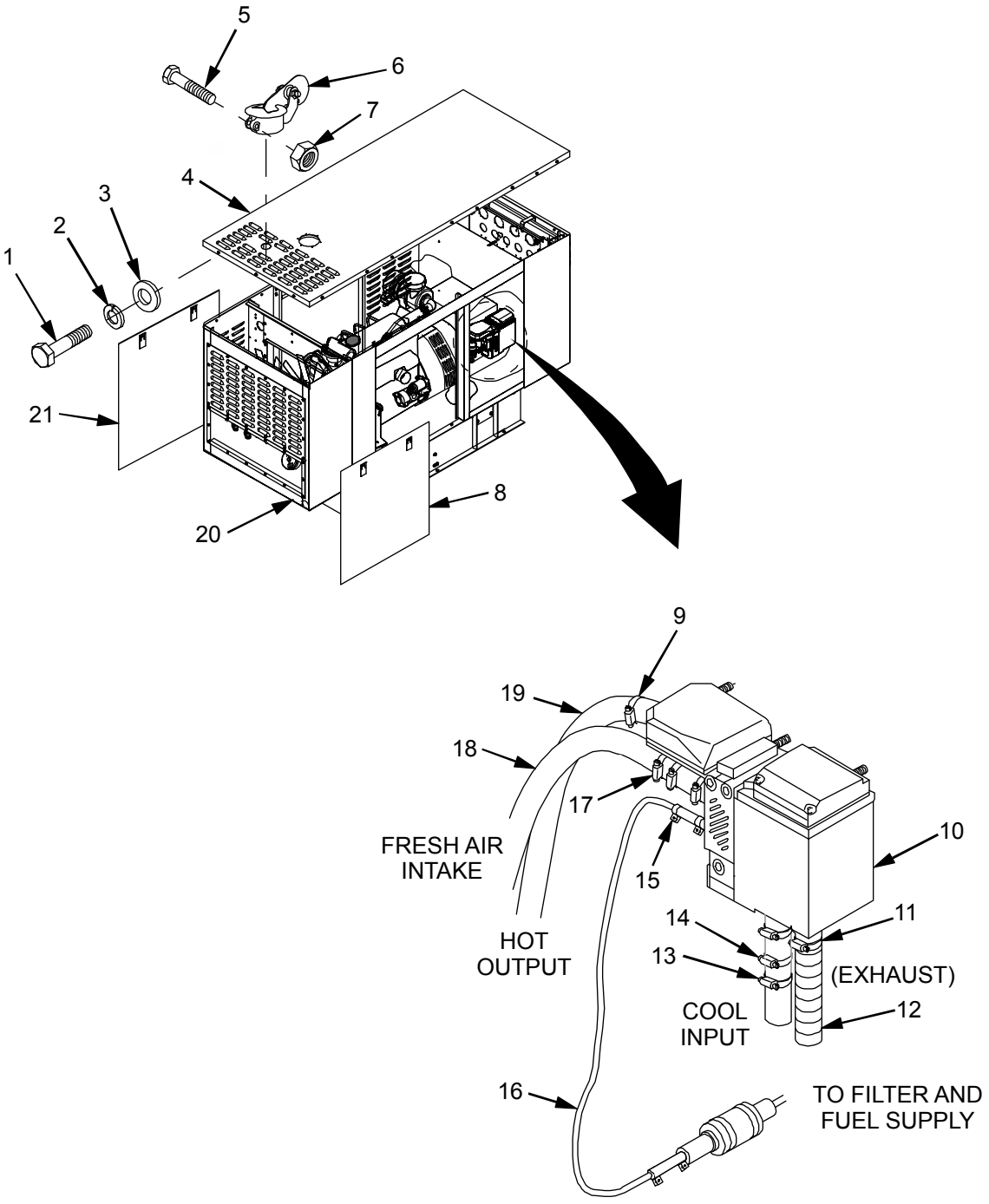


Figure 3. Engine Heater (Hydronic) Hose Removal/Replacement.

END OF TASK

ENGINE HEATER (HYDRONIC) FUSE REMOVAL/REPLACEMENT

INITIAL SETUP:

Materials/Parts
Fuse

References
WP 0005

Personnel Required
One

Equipment Condition
Genset shutdown
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

REMOVAL

1. Verify that Genset (Figure 4, Item 1) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove front access door (Figure 4, Item 2) on Genset (Figure 4, Item 1) and set aside.
3. Locate fuse holder (Figure 4, Item 4) on engine heater (hydronic) (Figure 4, Item 3) and open cover.
4. Identify and remove bad fuse (Figure 4, Items 5 and 6).

END OF TASK

REPLACEMENT

1. Replace fuse (Figure 4, Items 5 and 6) with proper type and value.
2. Close fuse holder (Figure 4, Item 4).
3. Install access door (Figure 2, Items 2) on Genset (Figure 2, Item 1).
4. Start Genset/engine heater (hydronic) in accordance with Genset Start Procedure (WP 0005) of this TM and check engine heater (hydronic) for leaks.

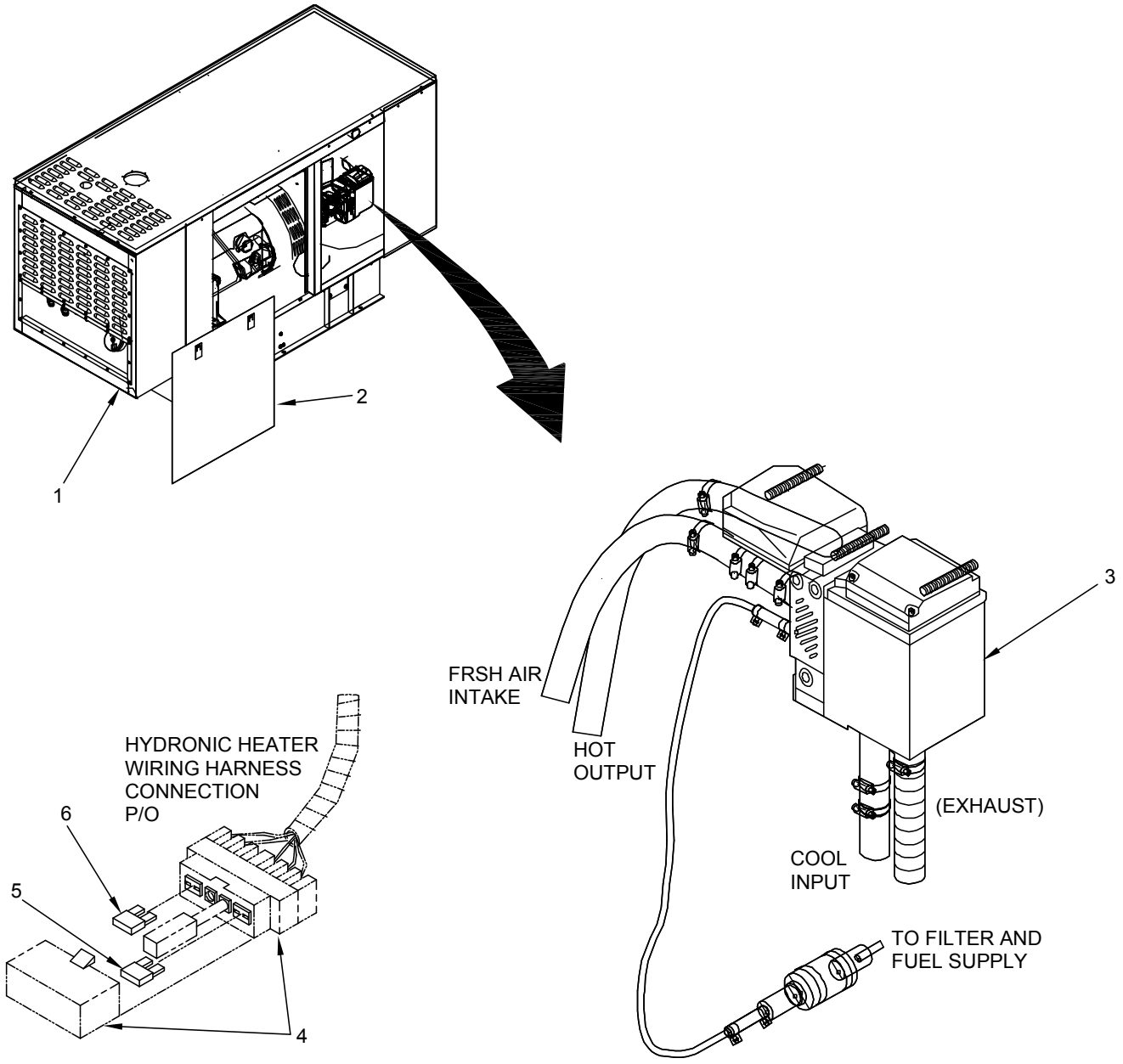


Figure 4. Engine Heater (Hydronic) Hose Fuse Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET EXHAUST SYSTEM

GENERAL

This work package provides information on the removal and replacement of the exhaust flex pipe, elbow and muffler for the Genset.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

EXHAUST FLEX PIPE, ELBOW AND MUFFLER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Exhaust flex pipe
Exhaust elbow
Muffler

Personnel Required
One

References
WP 0005

Equipment Condition
Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

FLEX PIPE

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove front and rear access panels (Figure 1, Items 7 and 8) and set aside.

CAUTION

Due to moisture and constant heating and cooling of exhaust system, hardware can become rusted and brittle. Hardware can be extremely difficult to loosen and disassemble. Do not force. Hardware damage could occur to exhaust pipe clamps and U-bolts or to exhaust flex pipe.

4. Remove and retain two nuts (Figure 1, Item 16) from clamp (Figure 1, Item 15) and U-bolt (Figure 1, Item 18).
5. Remove and retain clamp (Figure 1, Item 15) and U-bolt (Figure 1, Item 18).
6. Remove and retain two nuts (Figure 1, Item 13) from clamp (Figure 1, Item 14) and U-bolt (Figure 1, Item 21).
7. Remove and retain clamp (Figure 1, Item 14) and U-bolt (Figure 1, Item 21).

REMOVAL – Continued

NOTE

When performing the following step, it may be necessary to grip the exhaust pipe and twist in a clockwise/counter clockwise motion to break seal.

8. Remove exhaust flex pipe (Figure 1, Item 19) from exhaust manifold (Figure 1, Item 17) and exhaust elbow (Figure 1, Item 23) (located on the enclosure wall).

9. Slide exhaust flex pipe (Figure 1, Item 19) out of exhaust blanket (Figure 1, Item 20).

END OF TASK

REPLACEMENT

NOTE

New exhaust flex pipe (Figure 1, Item 19) is not pre-bent. Care must be taken to ensure that exhaust flex pipe (Figure 1, Item 19) is not twisted when assembled to reduce excessive stress on the exhaust flex pipe (Figure 1, Item 19) and cause premature failure.

1. Slide exhaust blanket (Figure 1, Item 20) onto exhaust flex pipe (Figure 1, Item 19) so that angle in heat shield is aligned with 90 degree bend in exhaust flex pipe (Figure 1, Item 19).

2. Insert exhaust flex pipe (Figure 1, Item 19) into the exhaust manifold (Figure 1, Item 17).

NOTE

If reusing exhaust system parts, parts may be crimped from prior installation. Use of pipe wrench may be necessary to insert pipe fully.

3. If necessary, bend exhaust flex pipe (Figure 1, Item 19) to align with exhaust elbow (Figure 1, Item 23).

4. Insert the exhaust flex pipe (Figure 1, Item 19) into the exhaust pipe elbow (Figure 1, Item 23).

5. Install two U-bolts (Figure 1, Items 18 and 21) and clamps (Figure 1, Items 15 and 14). Secure with four nuts (Figure 1, Items 13 and 16).

6. Install two access panels (Figure 1, Items 7 and 8).

7. Install cargo restraints (not shown).

8. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM

END OF TASK

EXHAUST ELBOW

REMOVAL

WARNING

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove front and rear access panels (Figure 1, Items 7 and 8) and set aside.
4. Loosen but do not remove nut (Figure 1, Item 6) and bolt (Figure 1, Item 4) that secures exhaust pipe cap (Figure 1, Item 5). Remove exhaust pipe cap (Figure 1, Item 5) and set aside.
5. Remove and retain 20 sheet metal screws (Figure 1, Item 1), lock washers (Figure 1, Item 2) and flat washers (Figure 1, Item 3) that secure top access panel to Genset enclosure. Remove top access panel and set aside.

CAUTION

Due to moisture and constant heating and cooling of exhaust system, hardware can become rusted and brittle. Hardware can be extremely difficult to loosen and disassemble. Do not force hardware; damage could occur to clamps (Figure 1, Items 14 and 26) and U-bolts (Figure 1, Items 21 and 26) or to exhaust flex pipe (Figure 1, Item 19) or exhaust pipe elbow (Figure 1, Item 23).

6. Remove and retain two nuts (Figure 1, Item 13) from clamp (Figure 1, Item 14) and U-bolt (Figure 1, Item 21).
7. Remove and retain clamp (Figure 1, Item 14) and U-bolt (Figure 1, Item 21).
8. Remove exhaust flex pipe (Figure 1, Item 19) from exhaust pipe elbow (Figure 1, Item 23).
9. Remove and retain two nuts (Figure 1, Item 28) from clamp (Figure 1, Item 27) and U-bolt (Figure 1, Item 26).
10. Remove and retain clamp (Figure 1, Item 27) and U-bolt (Figure 1, Item 26).
11. Loosen but do not remove bolt (Figure 1, Item 29), nut (Figure 1, Item 33), and two flat washers (Figure 1, Item 32) that secure mounting bracket (Figure 1, Item 25) to muffler (Figure 1, Item 34).

NOTE

When performing the following step, do not slide muffler (Figure 1, Item 34) out of mounting bracket (Figure 1, Item 31). Allow mounting bracket (Figure 1, Item 31) to support muffler (Figure 1, Item 34).

12. Slide muffler (Figure 1, Item 34) away from exhaust pipe elbow (Figure 1, Item 23).
13. Remove and retain four nuts (Figure 1, Item 25), flat washers (Figure 1, Item 24), bolts (Figure 1, Item 12) and flat washers (Figure 1, Item 11) that secure exhaust plate (Figure 1, Item 22) and exhaust pipe elbow (Figure 1, Item 23) to Genset frame.

REMOVAL – Continued

14. Remove exhaust plate (Figure 1, Item 22) and exhaust pipe elbow (Figure 1, Item 23).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps, inspect all parts for wear and tear and corrosion. If excessive wear or corrosion is present, replace affected parts.

Before tightening various clamps and associated hardware, align top of Genset with exhaust stack to ensure all openings align properly.

1. Install exhaust plate (Figure 1, Item 22) and exhaust pipe elbow (Figure 1, Item 23) and secure using four nuts (Figure 1, Item 25), bolts (Figure 1, Item 12) and eight flat washers (Figure 1, Items 11 and 24)
2. Slide muffler (Figure 1, Item 34) into exhaust pipe elbow (Figure 1, Item 23).
3. Assemble U-bolt (Figure 1, Item 26) and clamp (Figure 1, Item 27) and position on exhaust pipe elbow (Figure 1, Item 23) and secure using two nuts (Figure 1, Item 28).

NOTE

Ensure that exhaust bracket has not separated from the inside of the enclosure wall. The exhaust bracket is held onto the wall with glue, but extreme heat can cause the glue to fail.

4. Position muffler (Figure 1, Item 34) in mounting bracket (Figure 1, Item 31) and tighten bolt (Figure 1, Item 29), nut (Figure 1, Item 33), and two flat washers (Figure 1, Item 32).
5. Install exhaust flex pipe (Figure 1, Item 19) onto exhaust pipe elbow (Figure 1, Item 23).
6. Assemble U-bolt (Figure 1, Item 21) and clamp (Figure 1, Item 14). Position on exhaust pipe elbow (Figure 1, Item 23) and secure using two nuts (Figure 1, Item 13).
7. Tighten all hardware associated with clamps and brackets.
8. Install top access panel to Genset enclosure and secure with 20 sheet metal screws (Figure 1, Item 1), lock washers (Figure 1, Item 2) and flat washers (Figure 1, Item 3).
9. Install exhaust pipe cap (Figure 1, Item 5) and tighten nut (Figure 1, Item 6) and bolt (Figure 1, Item 4).
10. Install two access panels (Figure 1, Items 7 and 8).
11. Install cargo restraints (not shown) to gain access to rear of Genset.
12. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

MUFFLER

REMOVAL

WARNING

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.

3. Loosen but do not remove nut (Figure 1, Item 6) and bolt (Figure 1, Item 4) that secures exhaust pipe cap (Figure 1, Item 5). Remove exhaust pipe cap (Figure 1, Item 5) and set aside.

4. Remove and retain 20 sheet metal screws (Figure 1, Item 1), lock washers (Figure 1, Item 2) and flat washers (Figure 1, Item 3) that secures top access panel to Genset enclosure. Remove top access panel.

5. Remove and retain two nuts (Figure 1, Item 28) from clamp (Figure 1, Item 27) and U-bolt (Figure 1, Item 26).

6. Remove and retain clamp (Figure 1, Item 27) and U-bolt (Figure 1, Item 26).

7. Loosen but do not remove bolt (Figure 1, Item 29), nut (Figure 1, Item 33), and two flat washers (Figure 1, Item 32) that secure mounting bracket (Figure 1, Item 31) to muffler (Figure 1, Item 34).

8. Slide muffler (Figure 1, Item 34) away from exhaust pipe elbow (Figure 1, Item 23) and out of mounting bracket (Figure 1, Item 31).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps, inspect all parts for wear and tear and corrosion. If excessive wear or corrosion is present, replace affected pieces.

Before tightening various clamps and associated hardware, align top of Genset with exhaust stack to ensure all openings align properly.

Ensure that exhaust bracket has not separated from the inside of the enclosure wall. The exhaust bracket is held onto the wall with glue, but extreme heat can cause the glue to fail.

1. Slide muffler (Figure 1, Item 34) into mounting bracket (Figure 1, Item 31) and connect to exhaust pipe elbow (Figure 1, Item 23).

2. Position muffler (Figure 1, Item 34) in mounting bracket (Figure 1, Item 31) and tighten bolt (Figure 1, Item 29), nut (Figure 1, Item 33) and two flat washers (Figure 1, Item 32).

3. Install clamp (Figure 1, Item 27) and U-bolt (Figure 1, Item 26) and secure using two nuts (Figure 1, Item 28).

REPLACEMENT – Continued

4. Install top access panel to Genset enclosure and secure with 20 sheet metal screws (Figure 1, Item 1) lock washers (Figure 1, Item 2) and flat washers (Figure 1, Item 3).

5. Install exhaust pipe cap (Figure 1, Item 5) and tighten nut (Figure 1, Item 6) and bolt (Figure 1, Item 4).

6. Install cargo restraints (not shown).

7. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

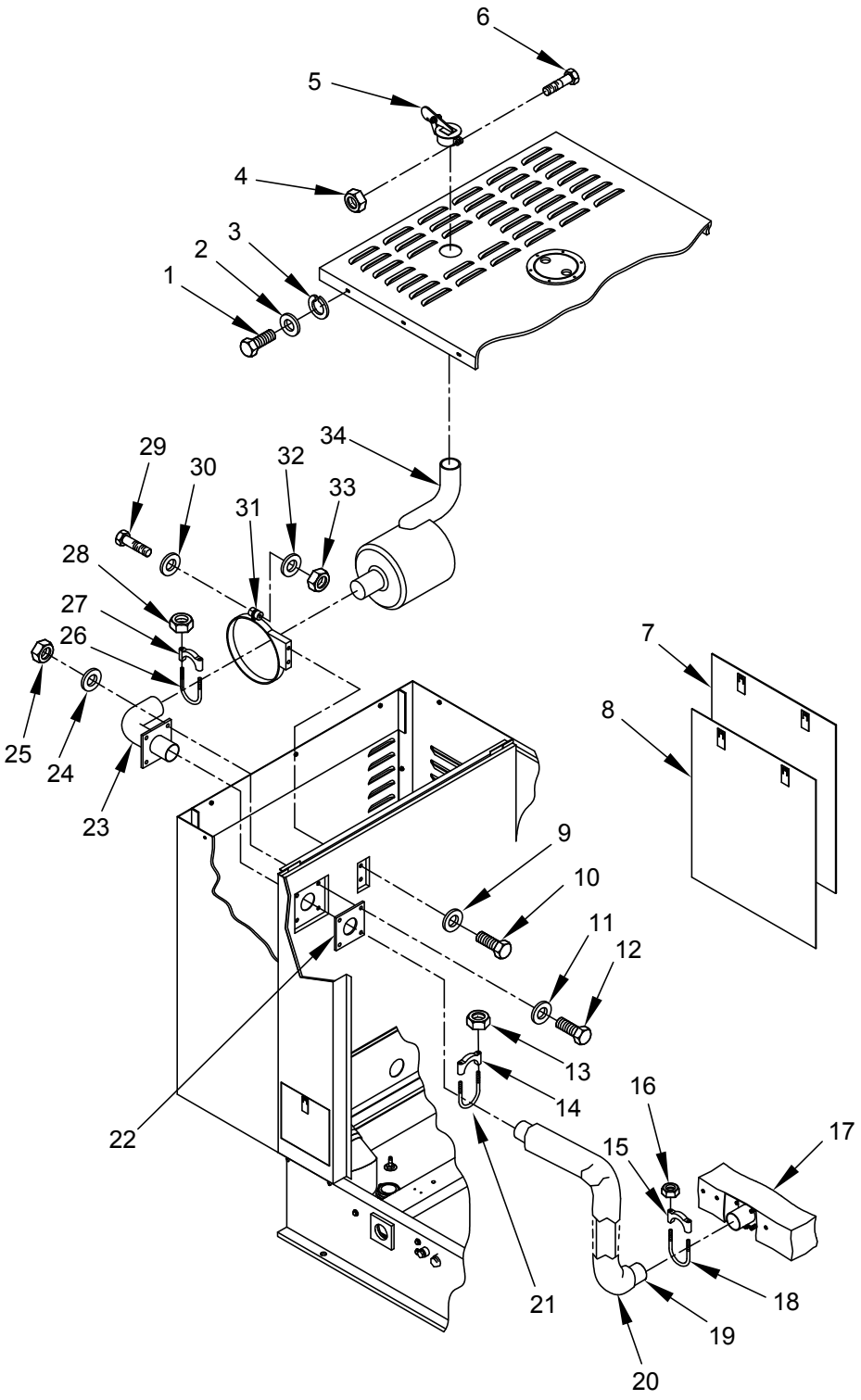


Figure 1. Exhaust Flex Pipe, Elbow and Muffler Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET EXHAUST MANIFOLD

GENERAL

This work package provides information on the removal and replacement of the exhaust manifold and gasket for the Genset. If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset is in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

EXHAUST MANIFOLD AND GASKET REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit, (WP 0165, Item 1)
Safety glasses

Materials/Parts
Exhaust manifold
Exhaust manifold gasket
T-slot gasket
Anti-seize compound
(WP 0168, Item 3)

Personnel Required
One

References
WP 0005

Equipment Condition
Genset shut down
BATTERY SWITCH – OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove front and rear access panels and set aside.

CAUTION

Due to moisture and constant heating and cooling of exhaust system, hardware can become rusted and brittle. Hardware can be extremely difficult to loosen and disassemble. Do not force. Hardware damage could occur to exhaust pipe clamps and U-bolts or to exhaust flex pipe.

4. Remove three locking clips securing manifold heat shield to manifold. Remove heat shield.
5. Remove U-bolt (Figure 1, Item 11), clamp (Figure 1, Item 9), and two nuts (Figure 1, Item 8) from exhaust pipe (Figure 1, Item 10) and T-slot (Figure 1, Item 7).
6. Remove four mounting nuts (Figure 1, Item 12) and lock washers (Figure 1, Item 13) to remove T-slot (Figure 1, Item 7) and gasket (Figure 1, Item 6) from manifold (Figure 1, Item 4). Discard gasket.

REMOVAL – Continued

7. Remove four mounting bolts (Figure 1, Item 15) from manifold (Figure 1, Item 4).
8. Remove four locking nuts (Figure 1, Item 14) from manifold (Figure 1, Item 4).
9. Slide exhaust manifold (Figure 1, Item 4) off of engine (Figure 1, Item 1) and discard old gasket (Figure 1, Item 3).

END OF TASK

REPLACEMENT

NOTE

Prior to performing replacement procedure, ensure area is clean and free of dirt, grime and old gasket residue.

1. Place new manifold gasket (Figure 1, Item 3) over exhaust mounting studs (Figure 1, Item 2).
2. Slide exhaust manifold (Figure 1, Item 4) into position on mounting studs (Figure 1, Item 2).
3. Install four locking nuts (Figure 1, Item 14) on the manifold mounting studs (Figure 1, Item 2).

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

4. Apply anti-seize compound on the exhaust manifold bolts (Figure 1, Item 15) and install into exhaust manifold (Figure 1, Item 4) and engine (Figure 1, Item 1).
5. Using torque wrench, tighten manifold bolts (Figure 1, Item 15) and locking nuts (Figure 1, Item 14) to 14~21 ft./lb (19~28 n-m/1.9~2.9 kgf-m). (Tighten in a cross pattern, starting from the center and working out.)
6. Install new gasket (Figure 1, Item 6) onto manifold studs (Figure 1, Item 5).
7. Install T-Slot (Figure 1, Item 7) onto the manifold (Figure 1, Item 4).
8. Install four lock washers (Figure 1, Item 13) and mounting nuts (Figure 1, Item 12) and tighten.
9. Install U-bolt (Figure 1, Item 11), clamp (Figure 1, Item 9), and 2 nuts (Figure 1, Item 8) onto exhaust pipe (Figure 1, Item 10) and T-slot (Figure 1, Item 7).
10. Install heat shield and secure with 3 locking clips.

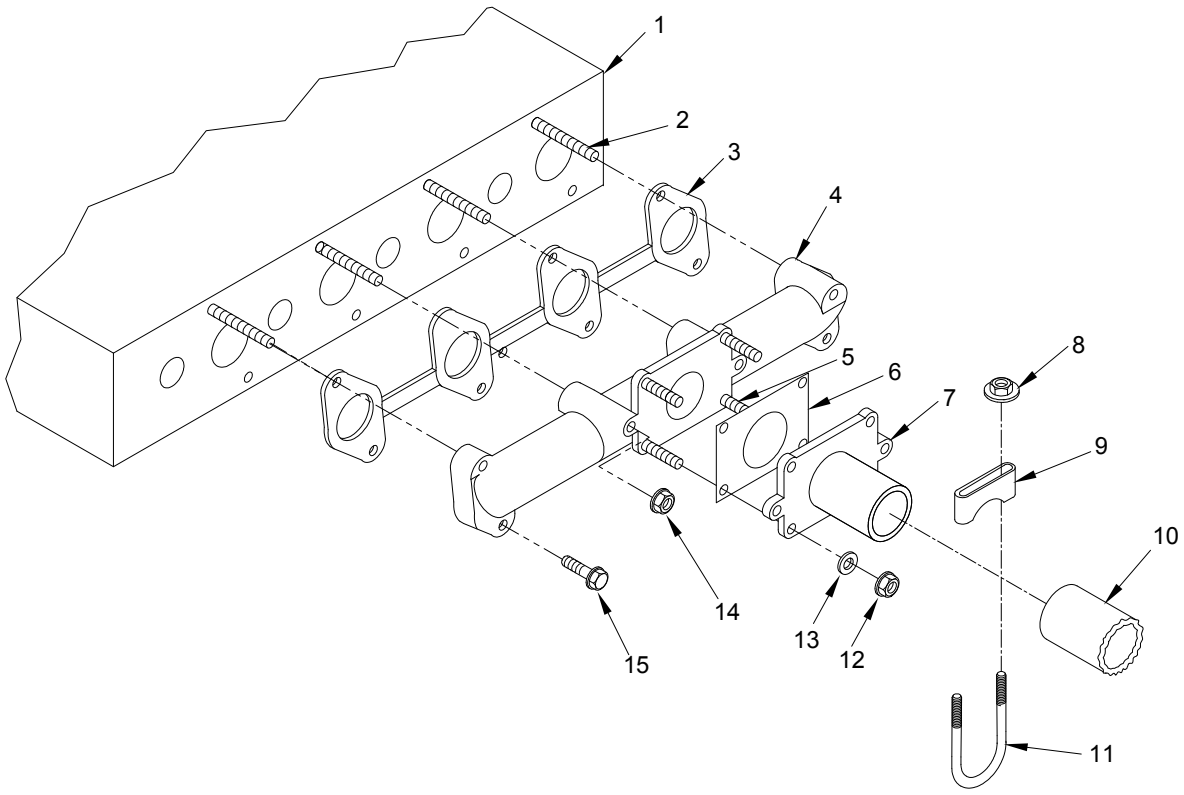


Figure 1. Exhaust Manifold and Gasket Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TORQUE SPECIFICATIONS

GENERAL

This section provides general torque limits for bolts used on the TMSS-MED. Special torque limits are indicated in the maintenance procedures for applicable components. The general torque limits given in this work package shall be used when specific torque limits are not indicated in the maintenance procedure. These general torque limits cannot be applied to bolts that retain rubber components. The rubber components will be damaged before the correct torque limit is reached. If a special torque limit is not given in the maintenance instructions, tighten the bolt or nut until it touches the metal bracket, then tighten it one more turn.

TIGHTENING METAL FASTENERS

When torqueing a fastener, select a torque wrench that's range fits the required torque value. A torque wrench is most accurate from 25 percent to 75 percent of its stated range. A torque wrench with the stated range of 0 to 100 will be most accurate from 25 to 75 foot-pounds. The accuracy of readings will decrease as you approach 0 foot-pounds or 100 foot-pounds. The ranges are based on this principle.

CONVERSION TABLES

Because much of the hardware used on the engine for the Genset is metric. It may be necessary to convert the torque requirements from metric [Newton-meters (N-m) or Kilogram meters (kgf)] to English (Foot Pounds).

TORQUE LIMITS

(Table 3) lists torque limits for standard *metric* bolts. (Table 4) lists torque limits for flanged *metric* bolts.

HOW TO USE TORQUE TABLES

1. Measure the diameter of the bolt to be installed.

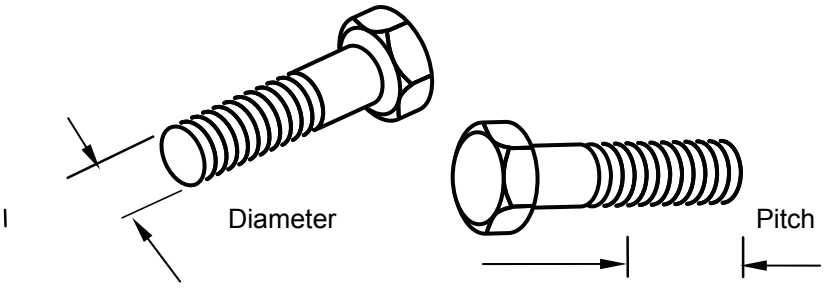


Figure 1. Bolt Diameter and Thread Pitch.

2. Count the number of threads per inch or use a pick gauge.

3. Under the heading SIZE, look down the left hand column until the diameter of bolt to be installed is found (there will usually be two lines beginning with the same size).

4. In the second column under SIZE, find the number of threads per inch that matches the number of threads counted in step 2.

COMPONENT SPECIFIC TORQUE LIMITS

(Table 1) lists torque limits for specific components of the TMSS-MED. These torque limits are also listed in their associated WPs.

Table 1. Component Torque Specifications.

Engine Component	Torque Requirements			Work Package
	lb. ft	N-m	kgf-m	
Alternator Mounting Bolts	14~21	19~28	1.9~2.9	0067
Alternator Bracket Hinge Bolt	25~34	34~46	3.5~4.7	0067
Brakes – Cap screws	12.58~15.42	17.1~20.9	1.74~2.13	0125
Brakes – Backing plate	45~55	62~76	6.32~7.75	0125
Brakes – Pre brake adjustment	12.75~15.58	17.1~20.9	1.74~2.13	0125
Brakes – Post brake adjustment	16.5~20.16	21.6~26.4	2.2~2.69	0125
Coolant Temperature Sensor	9~13	12~18	1.2~1.8	0062
Coolant Temperature Switch	9~13	12~18	1.2~1.8	0063
Exhaust Manifold Bolts	14~21	19~28	1.9~2.9	0073
Fan blade	17.4	23.5	2.4	0069
Fuel injector – Hold-down bolt	23~30	31~41	3.2~4.2	0058
Fuel injector – injector line hardware	11~18	19~28	1.9~2.9	0058
Fuel injector – pump hardware	14~21	19~28	1.9~2.9	0058
Fuel injector – Injector rail bolts	7~10	10~14	1.0~1.4	0058
Fuel injector – Injector pump rail bolts	15~18	20~25	2.0~2.5	0058
Generator – Alignment studs	35~40	47.45~54.23	4.84~5.53	0123
Generator – Flex plate mounting bolts	17~20	23.05~27.11	2.35~2.76	0123
Generator – Generator mounting bolts	35~40	47.45~54.23	4.84~5.53	0123
Generator – Metal grille	7~10	9.49~13.55	0.97~1.38	0123
Engine Mounting nuts (4 ea.)	51	69.15	7.05	0123
Glow Plug	11~14	15~20	1.5~2.0	0051
Starter Bolts	93~113	69~83	9.5~11.5	0060
Thermostat housing	14~21	19~28	1.9~2.9	0064
Tire and Wheel Assembly	95~105	129~143	13.2~14.6	0080
Water Pump	14~21	19~28	1.9~2.9	0070

GENERAL TORQUE REQUIREMENTS

NOTE

The torque specifications in (Table 2) and (Table 3) apply only when other torque specifications are not stated in the procedure.

The asterisk (*) indicates that bolts are used for female threaded parts that are made of soft materials.

Table 2. Flanged Head Bolt Torque Specifications.

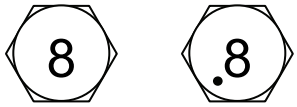
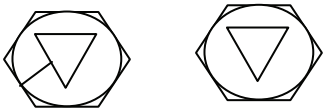
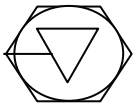
Bolt Identification						
Bolt Dia x Pitch (mm)	**N-m**	**kgf m**	**N-m**	**kgf m**	**N-m**	**kgf m**
M6 x	4.6~8.5	0.5~0.9	6.6~12.2	0.6~1.2		
M8 x 1.25	10.5~19.6	1.1~2.0	151.3~28.4	1.6~2.9	18.1~33.6	2.1~3.4
M10 x 1.25	23.1~38.5	2.4~3.9	35.4~58.9	3.6~6.1	42.3~70.5	4.3~7.2
*M10 x 1.5	22.3~37.2	2.3~3.8	34.5~57.5	3.5~5.8	40.1~66.9	4.1~6.8
M12 x 1.5	54.9~82.3	5.6~8.4	77.7~117.0	77.9~11.9	85.0~128.0	8.7~13.0
*M12 x 1.25	51.0~76.5	5.2~7.8	71.4~107.0	7.3~10.9	79.5~119.0	8.1~12.2
M14 x 1.5	83.0~125.0	8.5~12.7	115~172.0	11.7~17.6	123.0~185.0	12.6~18.9
*M14 x 2.0	77.2~116.0	7.9~11.8	108.0~162.0	11.1~16.6	116.0~173.0	11.8~17.7
M16 x 1.5	116.0~173.0	11.8~17.7	171.0~257.0	17.4~26.2	117.0~165.0	18.0~27.1
*M16 x 2.0	109.0~164.0	11.2~16.7	163.0~244.0	16.6~24.9	169.0~253.0	17.2~25.8

Table 3. Standard Bolt Torque Specifications.

Bolt Identification						
Bolt Dia x Pitch (mm)	**N-m**	**kgf m**	**N-m**	**kgf m**	**N-m**	**kgf m**
M6 x	3.9~7.8	0.4~0.8	4.9~9.8	0.5~1.0		
M8 x 1.0	7.8~17.7	0.8~1.8	11.8~22.6	1.2~2.3	16.7~30.4	1.7~3.1
M10 x 1.25	20.6~34.3	2.1~3.5	27.5~46.1	2.8~4.7	37.3~62.8	3.8~6.4
*M10 x 1.5	19.6~33.4	2.0~3.4	27.5~45.1	2.8~4.6	36.3~59.8	3.7~6.1
M12 x 1.5	49.1~73.6	5.0~7.5	60.8~91.2	6.2~9.3	75.5~114.0	7.7~11.6
*M12 x 1.25	45.1~68.7	4.6~7.0	56.9~84.4	5.8~8.6	71.6~107.0	7.3~10.9
M14 x 1.5	76.5~115.0	7.8~11.7	93.2~139.0	9.5~14.2	114.0~171.0	11.6~17.4
*M14 x 2.0	71.6~107.0	7.3~10.9	88.3~131.0	9.0~13.4	107.0~160.0	10.9~16.3
M16 x 1.5	104.0~157.0	10.6~16.0	135.0~204.0	13.8~20.8	160.0~240.0	19.3~24.5
*M16 x 2.0	100.0~149.0	10.2~15.2	129.0~194.0	13.2~19.8	153.0~230.0	15.6~23.4
M18 x 2.0	151.0~226.0	15.4~23.0	195.0~293.0	19.9~29.9	230.0~345.0	23.4~35.2
*M18 x 2.5	151.0~226.0	15.4~23.0	196.0~294.0	20.0~30.0	231.0~346.0	23.6~35.3

GENERAL TORQUE REQUIREMENTS – Continued

Table 3. Standard Bolt Torque Specifications - Continued.

Bolt Identification						
						
Bolt Dia x Pitch (mm)	**N-m**	**kgf m**	**N-m**	**kgf m**	**N-m**	**kgf m**
M20 x 1.5	206.0~310.0	21.0~31.6	270.0~405.0	27.5~41.3	317.0~476.0	32.3~48.5
*M20 x 2.5	190.0~286.0	19.4~29.2	249.0~375.0	25.4~38.2	293.0~440.0	29.9~44.9
M22 x 1.5	251.0~414.0	25.6~42.2	363.0~544.0	37.0~55.5	425.0~637.0	43.3~64.9
*M22 x 2.5	218.0~328.0	22.2~33.4	338.0~507.0	34.5~51.7	394.0~592.0	40.2~60.4
M24 x 2.0	359.0~540.0	36.6~55.0	431.0~711.0	43.9~72.5	554.0~831.0	56.5~84.7
*M24 x 3.0	338.0~507.0	34.5~51.7	406.0~608.0	41.4~62.0	521.0~782.0	53.1~79.7

CONVERSION TABLES

Table 4. Newton-Meters to Kilogram-Meters.

n-m	0	10	20	30	40	50	60	70	80	90
----	**kgf-m**	**kgf-m**	**kgf-m**	**kgf-m**	**kgf-m**	**kgf-m**	**kgf-m**	**kgf-m**	**kgf-m**	**kgf-m**
----	----	1.020	2.039	3.059	4.079	5.099	6.118	7.138	8.158	9.177
100	10.197	11.217	12.236	13.256	14.276	15.296	16.315	17.335	18.355	19.374
200	20.394	21.414	22.433	23.453	24.473	25.493	26.512	27.532	28.552	29.571
300	30.591	31.611	32.630	33.650	34.670	35.690	36.709	37.729	38.749	39.768
400	40.788	41.808	42.827	443867	44.867	45.887	46.906	47.926	448.946	49.965
500	50.985	52.005	53.024	55.064	55.064	56.084	57.103	58.123	59.143	60.162
600	61.182	62.202	63.221	65.261	65.261	66.281	57.103	68.320	69.340	70.359
700	71.379	72.399	73.418	75.458	75.458	76.478	67.300	78.157	79.537	80.556
800	81.576	82.596	83.615	84.635	85.655	86.675	87.694	88.714	89.734	90.753
900	91.773	92.793	93.812	94.832	95.852	96.872	97.891	98.911	99.931	100.950
1000	101.970	102.990	104.009	105.029	106.049	107.069	108.088	109.108	110.128	111.147

Table 5. Kilogram-Meters to Foot Pounds.

kgf-m	0	1	2	3	4	5	6	7	8	9
----	**ft. lbs**	**ft. lbs**	**ft. lbs**	**ft. lbs**	**ft. lbs**	**ft. lbs**	**ft. lbs**	**ft. lbs**	**ft. lbs**	**ft. lbs**
----	----	7.23	14.47	21.70	28.93	36.17	43.40	50.63	57.86	65.10
10	72.33	79.56	86.80	94.03	101.26	108.50	115.73	122.96	130.19	137.43
20	144.66	151.89	159.13	166.36	173.59	180.83	188.06	195.29	202.52	209.76
30	216.99	224.22	231.46	238.69	245.92	253.16	260.39	267.62	274.85	282.09
40	289.32	296.55	303.79	311.02	318.25	325.49	332.72	339.95	347.18	354.42
50	361.65	368.88	376.12	383.35	390.58	397.82	405.05	412.28	419.51	426.75
60	433.98	441.21	448.45	455.68	462.91	470.15	477.38	484.61	491.84	499.08
70	506.31	513.54	520.78	528.01	535.24	542.48	549.71	556.94	564.17	571.41
80	578.64	585.87	593.11	600.34	607.57	614.81	622.04	629.27	636.50	643.74
90	650.97	658.20	665.44	672.67	679.57	687.14	694.37	701.60	708.83	716.07
100	723.30	730.53	737.77	745.00	752.23	759.47	766.70	773.93	781.16	788.40

CONVERSION TABLES - Continued

Table 6. Newton-Meters to Foot Pounds.

n-m	ft. lb.	n-m	ft. lb.	n-m	ft. lb.	n-m	ft. lb.	n-m	ft. lb.
1.356	1	35.256	26	69.156	51	103.056	76	142.38	105
2.712	2	36.612	27	70.512	52	104.412	77	149.16	110
4.068	3	37.968	28	71.868	53	105.768	78	155.94	115
5.424	4	39.324	29	73.224	54	107.124	79	162.72	120
6.78	5	40.68	30	74.58	55	108.48	80	169.5	125
8.136	6	42.036	31	75.936	56	109.836	81	176.28	130
9.492	7	43.392	32	77.292	57	111.192	82	183.06	135
10.848	8	44.748	33	78.648	58	112.548	83	189.84	140
12.204	9	46.104	34	80.004	59	113.904	84	196.62	145
13.56	10	47.46	35	81.36	60	115.26	85	203.4	150
14.916	11	48.816	36	82.716	61	116.616	86	210.18	155
16.272	12	50.172	37	84.072	62	117.972	87	216.96	160
17.628	13	51.528	38	85.428	63	119.328	88	223.74	165
18.984	14	52.884	39	86.784	64	120.684	89	230.52	170
20.34	15	54.24	40	88.14	65	122.04	90	237.3	175
21.696	16	55.596	41	89.496	66	123.396	91	244.08	180
23.052	17	56.952	42	90.852	67	124.752	92	250.86	185
24.408	18	58.308	43	92.208	68	126.108	93	257.64	190
25.764	19	59.664	44	93.564	69	130.176	96	264.42	195
27.12	20	61.02	45	94.92	70	128.82	95	271.2	200
28.476	21	62.376	46	96.276	71	130.176	96	305.1	225
29.832	22	63.732	47	97.632	72	131.532	97	339	250
31.188	23	65.088	48	98.988	73	132.888	98	372.9	275
32.544	24	66.444	49	100.344	74	134.244	99	406.8	300
33.9	25	67.8	50	101.7	75	135.6	100	678	500

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET – CONTROL PANEL AC METERS

GENERAL

This work package provides information on the removal and replacement of components on the Genset control panel. They consist of:

- AC AMPERES meter
- HERTZ meter
- A-C KILOWATTS meter
- A-C VOLTS meter

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-13) for electrical schematics and wiring diagrams.

AC METERS ADJUSTMENT/REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
Meter(s)

Personnel Required
One

Reference
WP 0005, WP 0041, WP 0027,
FO-6 through FO-13

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is common to the following meters:

- AC AMPERES meter
- HERTZ meter
- A-C KILOWATTS meter
- A-C VOLTS meter

ADJUSTMENT

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
2. Open door and control panel, allow control panel to drop down and hang from lanyards.
3. Set multimeter for appropriate function and range.
4. Using multimeter, measure across meter and compare readings.
5. If necessary, adjust meter to match reading on multimeter.
6. If meter will not adjust in, replace as described in this WP.

END OF TASK

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).

3. Disconnect negative terminal from battery (see WP 0041).

4. Open door and control panel, allow control panel to drop down and hang from lanyards.

5. Remove and retain two nuts (Figure 1, Item 5) and lock washers (Figure 1, Item 6) that secure terminals (Figure 1, Item 7) to meter (Figure 1, Item 8).

6. Mark and disconnect terminals (Figure 1, Item 7) from meter (Figure 1, Item 8).

7. Remove and retain three nuts (Figure 1, Item 4), lock washers (Figure 1, Item 3) and flat washers (Figure 1, Item 2) that secure meter (Figure 1, Item 8) to control panel (Figure 1, Item 1).

8. Remove meter (Figure 1, Item 8) from control panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-13) for electrical schematics and wiring diagrams.

1. Insert meter (Figure 1, Item 8) into control panel (Figure 1, Item 1).

2. Secure meter (Figure 1, Item 8) to control panel (Figure 1, Item 1) using three flat washers (Figure 1, Item 2), lock washers (Figure 1, Item 3) and nuts (Figure 1, Item 4).

3. Connect terminals (Figure 1, Item 7) to appropriate connections on meter (Figure 1, Item 8) (See Table 1).

4. Secure terminals (Figure 1, Item 7) using two nuts (Figure 1, Item 5) and lock washers (Figure 1, Item 6).

5. Close control panel and secure to Genset.

6. Connect negative terminal to battery (see WP 0041) and start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

7. Observe readings on meter (Figure 1, Item 8). If readings are not correct proceed to adjustment procedure.

Table 1. Meter Connections.

METER ID	SCHEMATIC ID	METER CONNECTIONS	
		+	-
AC AMPERES	M1 AmA 0-100 AMPS	79-SW1-13	78-SW1-19
		80-CF2-21	
		50A-PNL-GND	
HERTZ	M2 FM 55-65 Hz	76-CF2-22	75-SW1-3
A-C KILOWATTS	M3 kWm 0-30 kW	82-CF2-13	81-CF2-22
A-C VOLTS	M4 VmA 0-300 VOLTS	84-SW1-6	83-SW1-6

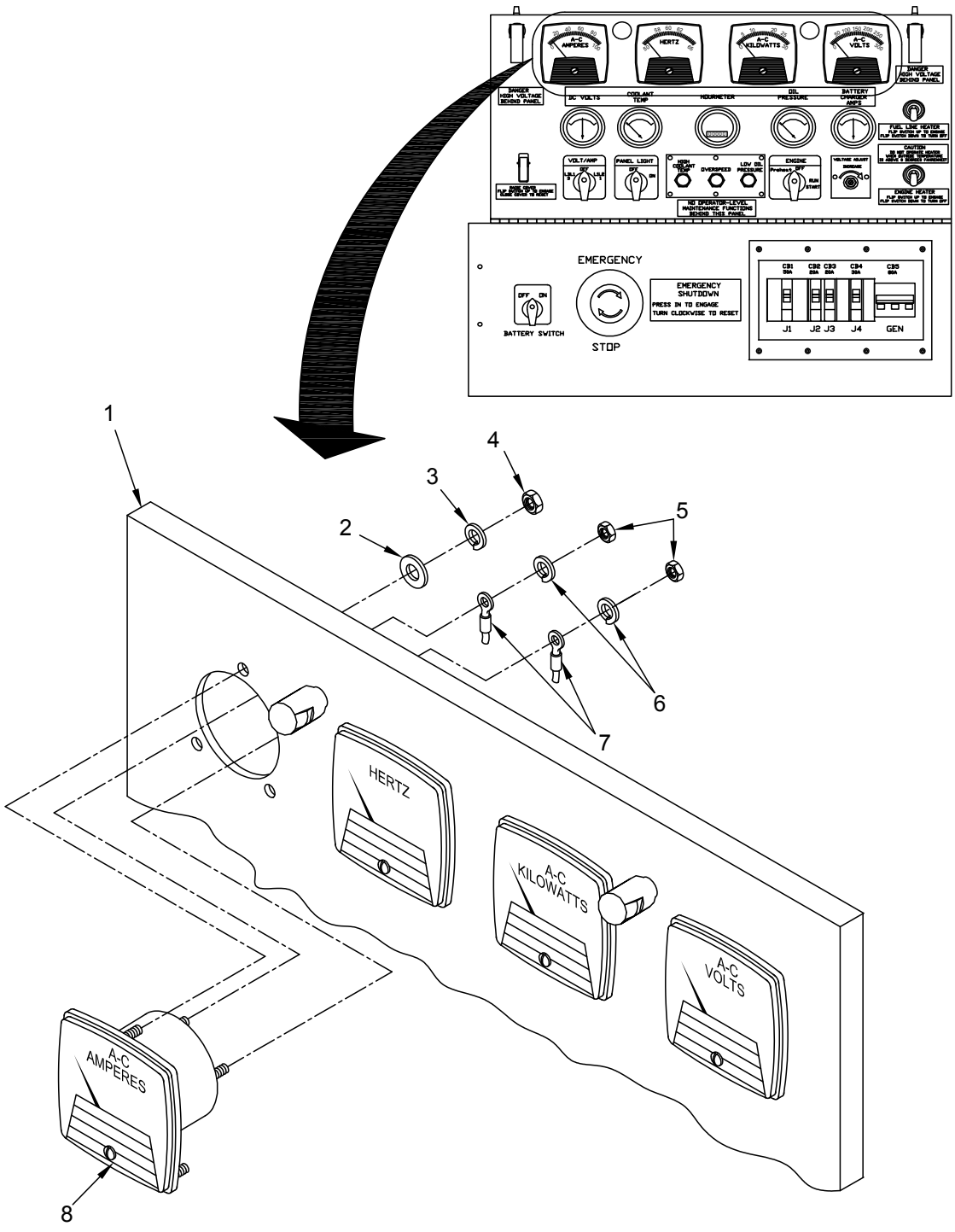


Figure 1. Meter Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET CONTROL PANEL – GAUGES AND METERS

GENERAL

This work package provides information on the removal and replacement of components on the Genset control panel. They consist of:

- DC VOLTS meter
- COOLANT TEMP gauge
- HOUR meter
- OIL PRESSURE gauge
- BATTERY CHARGER AMPS meter

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-13) for electrical schematics and wiring diagrams.

GAUGES AND METERS TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
Oil pressure gauge
Coolant temp gauge
DC volts meter
Battery charger meter

Personnel Required
One

Reference
WP 0005, WP 0041,
WP 0046, WP 0055,
FO-6 through FO-13

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

METER TESTS

DC VOLTS Meter

NOTE

The DC VOLTS meter receives signal from Engine Start Switch.

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
2. Open door and control panel, allow control panel to drop down and hang from lanyards.
3. Set multimeter to measure 28 VDC.
4. Attach ground (negative) lead of multimeter to ground wire (# 44-M6-G) of DC VOLTS meter.
5. Attach positive lead of multimeter to positive wire (#31-SW3-6) of DC VOLTS meter.
6. On front of control panel:
   a. Set BATTERY SWITCH to ON.
   b. Set ENGINE switch to RUN.
7. Compare reading on multimeter to reading on DC VOLTS meter. If readings do not match, replace DC VOLTS meter.

END OF TASK

BATTERY CHARGER AMPS Meter

NOTE

During normal operation Battery Charger should read 3-4 amps.

1. Open door and control panel, allow control panel to drop down and hang from lanyards.
2. Set multimeter to measure DC Amps.
3. Disconnect wire (# 38-SW2-1) from BATTERY CHARGER AMPS meter and connect to positive lead of multimeter.
4. Disconnect wire (# 39-CF2-12) from BATTERY CHARGER AMPS meter and connect to negative lead of multimeter.
5. Plug in Battery Charger and check reading on multimeter.
6. Connect wire (# 38-SW2-1) to BATTERY CHARGER AMPS meter.
7. Connect wire (# 39-CF2-12) to BATTERY CHARGER AMPS meter.
8. Compare reading on BATTERY CHARGER AMPS meter to reading recorded on multimeter, if readings are not consistent replace as described in this WP.

END OF TASK

GAUGE TESTS

OIL PRESSURE Gauge

1. Open door and control panel, allow control panel to drop down and hang from lanyards.
2. Set multimeter to measure resistance.
3. Disconnect wire (# 15-CF2-6) from OIL PRESSURE gauge and connect to positive lead of multimeter.
4. Attach ground (negative) lead of multimeter to center connection on OIL PRESSURE gauge.
5. Using multimeter, take resistance reading from sensor on OIL PRESSURE gauge.
6. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM and allow to run for 1 minute.
7. Using multimeter, take second resistance reading from sensor on OIL PRESSURE gauge. Resistance should reduce as oil pressure goes up.
    a. If resistance does not reduce, replace oil pressure sensor (see WP 0046 of this TM).
    b. If resistance does reduce disconnect multimeter and connect wire (# 15-CF2-6) to OIL PRESSURE gauge.
8. Observe OIL PRESSURE gauge. If OIL PRESSURE gauge does not move replace as described in this WP.

END OF TASK

COOLANT TEMP Gauge

1. Start with cold engine.
2. Open door and control panel, allow control panel to drop down and hang from lanyards.
3. Set multimeter to measure resistance.
4. Disconnect wire (# 14-CF2-5) from COOLANT TEMP gauge and attach to positive lead of multimeter.
5. Attach ground (negative) lead of multimeter to center connection on COOLANT TEMP gauge.
6. Using multimeter, take resistance reading from sensor on COOLANT TEMP gauge.
7. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM and allow to run for 15 minutes.
8. Using multimeter, take second resistance reading from sensor on COOLANT TEMP gauge. Resistance should decrease as temperature goes up.
   a. If resistance does not decrease, replace temperature sensor (see WP 0055 of this TM).
   b. If resistance decreases, disconnect multimeter and connect wire (# 14-CF2-5) to COOLANT TEMP gauge.
9. Observe COOLANT TEMP gauge. If gauge does not move replace as described in this WP.

END OF TASK

REMOVAL

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is common to the following meters:

- DC VOLTS meter
- BATTERY CHARGER meter
- COLANT TEMP gauge
- OIL PRESSURE gauge

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.

REMOVAL - Continued

NOTE

DC VOLTS and BATTERY CHARGER have connections on two of three terminals. COOLANT TEMP and OIL PRESSURE have connections on all three terminals.

4. Remove and retain nuts(s) (Figure 1, Item 4) and lock washer(s) (Figure 1, Item 3) that secure terminals (Figure 1, Item 2) to meter/gauge (Figure 1, Item 13).

5. Mark and disconnect terminals (Figure 1, Item 2) from meter/gauge (Figure 1, Item 13).

6. Remove and retain two nuts (Figure 1, Item 7), lock washers (Figure 1, Item 6) and bracket (Figure 1, Item 5) that secure meter/gauge (Figure 1, Item 13) to control panel (Figure 1, Item 1).

7. Remove meter/gauge (Figure 1, Item 13) from control panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

1. Install meter/gauge (Figure 1, Item 13) through control panel (Figure 1, Item 1).

2. Secure meter/gauge (Figure 1, Item 13) to control panel (Figure 1, Item 1) with bracket (Figure 1, Item 5) two nuts (Figure 1, Item 7) and lock washers (Figure 1, Item 6).

NOTE

DC VOLTS and BATTERY CHARGER have connections on two of three terminals. COOLANT TEMP and OIL PRESSURE have connections on all three terminals. Refer to Table 1 or FO-6 through FO-13 for proper connections.

3. Connect terminals (Figure 1, Item 2) to meter/gauge (Figure 1, Item 13).

4. Secure terminals (Figure 1, Item 2) to meter/gauge (Figure 1, Item 13) using nuts(s) (Figure 1, Item 4) and lock washer(s) (Figure 1, Item 3).

5. Close control panel and secure to Genset.

6. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Meter/Gauge Connections.

METER/GAUGE ID	SCHEMATIC ID	METER CONNECTIONS		
		Negative (I)	Positive (S)	Ground (G)
DC VOLTS	M5 VmD	31-SW3-6	no connection	44-M6-G
COOLANT TEMP	M6 CTG	30-R2-2	14-CF2-5	44-M5-G
OIL PRESSURE	M8 OPG	30-R2-2	15-CF2-6	50B-SW8-1
				40-CF2-13
				41-M6-G
				47-1 5-1
				46-1 4-1
BATTERY CHARGER	M9 AmD	38-SW2-1	39-CF2-12	no connection

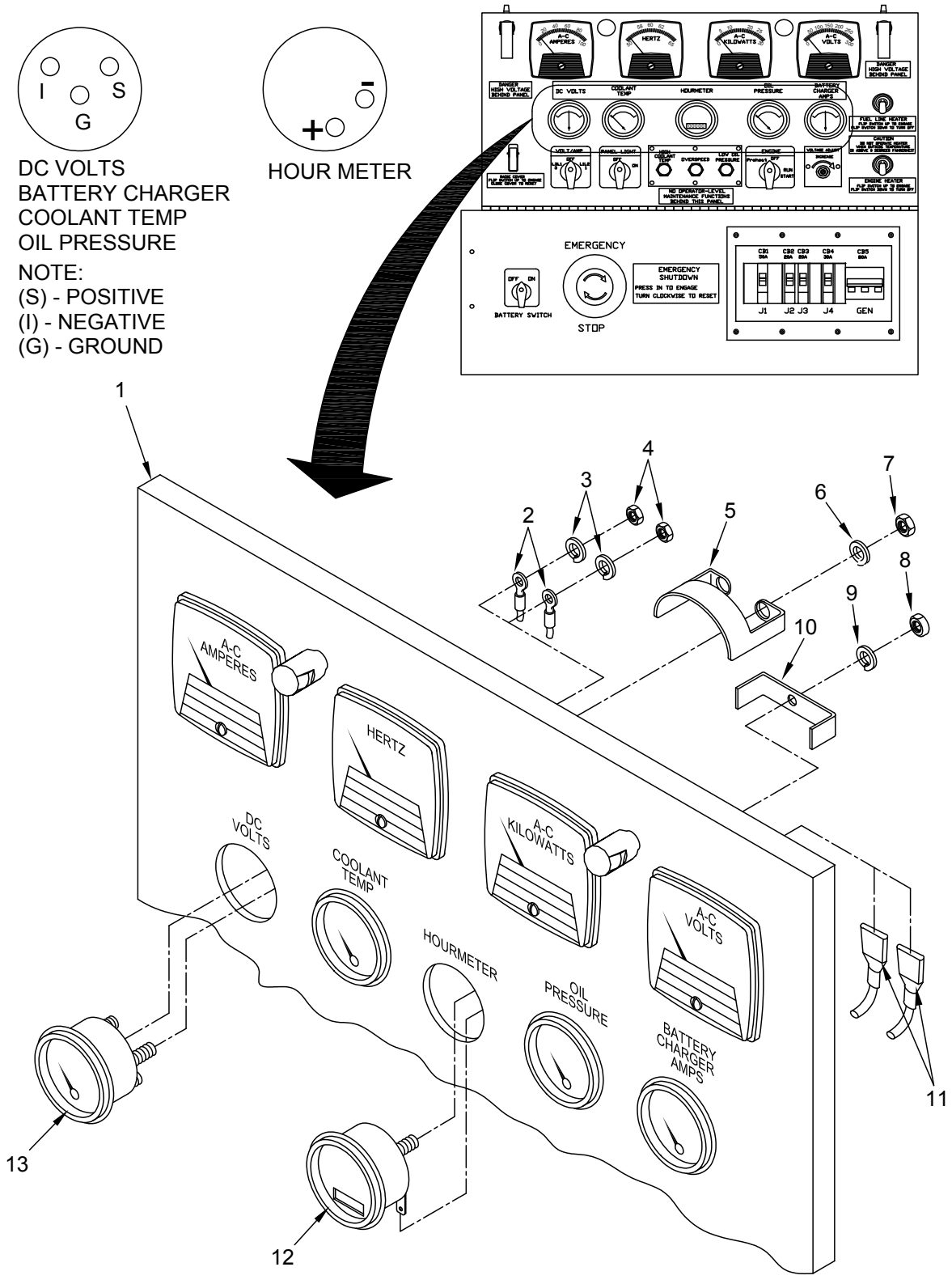


Figure 1. Meter/Gauge Removal/Replacement.

END OF TASK

HOUR METER TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)

Materials/Parts
Hour meter

Personnel Required
One

Reference
WP 0005, WP 0041

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

TEST

1. Open door and control panel, allow control panel to drop down and hang from lanyards.
2. Set multimeter to measure 24 VDC.
3. Disconnect wire (# 26-CF2-8) from positive (+) terminal on HOUR METER and connect to positive lead of multimeter.
4. Disconnect wire (# 44-M6-G) from (-) negative terminal on HOUR METER and connect to negative lead of multimeter.
5. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
6. Observe multimeter. Multimeter should read approximately 24 VDC.
   a. If multimeter does not read 24 VDC, troubleshoot engine/wiring.
   b. If multimeter does read 24 VDC, replace HOUR METER as described in this WP.

END OF TASK

REMOVAL

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Mark and disconnect two terminals (Figure 1, Item 11) from hour meter (Figure 1, Item 12).
5. Remove and retain nut (Figure 1, Item 8), lock washer (Figure 1, Item 9) and bracket (Figure 1, Item 10) that secures hour meter (Figure 1, Item 12) to control panel (Figure 1, Item 1).
6. Remove hour meter (Figure 1, Item 12) from control panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

1. Install hour meter (Figure 1, Item 12) through control panel (Figure 1, Item 1).
2. Secure hour meter (Figure 1, Item 12) to control panel (Figure 1, Item 1) with bracket (Figure 1, Item 10) nut (Figure 1, Item 8) and lock washer (Figure 1, Item 9).
3. Connect two terminals (Figure 1, Item 11) to hour meter (Figure 1, Item 12).
4. Close control panel and secure to Genset.
5. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 2. Hour Meter Connections.

METER/GAUGE ID	SCHEMATIC ID	METER CONNECTIONS	
		(+)	(-)
HOUR METER	M7 HM	26-CF2-8	44-M6-G

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET CONTROL PANEL – SWITCHES AND POTENTIOMETER

GENERAL

This work package provides information on the removal and replacement of components on the Genset control panel. They consist of:

- VOLTAGE ADJUST potentiometer
- BATTLE SHORT toggle switch
- ENGINE HEATER toggle switch
- FUEL LINE HEATER toggle switch
- VOLT/AMP rotary switch
- PANEL LIGHT rotary switch
- ENGINE rotary switch

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-13) for electrical schematics and wiring diagrams.

VOLTAGE ADJUST POTENTIOMETER TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
Potentiometer
Desoldering wick (WP 0168, Item 15)
Heat shrink (WP 0168, Items 31 to 34)
Strap ties (WP 0168, Item 55 to 57)
Alchohol, Isopropyl (WP 0168, Item 1)
Solder, electrical (WP 0168, Item 53)
Brush, acid (WP 0168, Item 9)

Personnel Required
One

Reference
WP 0005, WP 0041

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

TEST

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Verify that wiper (center post) is shorted to the Max terminal (shorted to wiper) .
3. Disconnect wiring from potentiometer.
4. Set multimeter to reads resistance (1K Ω).
5. Place meter leads on wiper and Min terminal (NOT shorted to wiper) of potentiometer.
6. Adjust potentiometer:
   a. If meter deflects smoothly and measure 1KΩ at maximum, potentiometer is good.
   b. If meter deflects erratically, suddenly drops to 0 Ω, or does not measure 1KΩ at maximum, potentiometer is bad, replace

END OF TASK

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel (Figure 1, Item 1), allow control panel (Figure 1, Item 1) to drop down and hang from lanyards. Remove any strap-ties securing associated wiring to control panel (Figure 1, Item 1).
4. Mark and disconnect terminals from leads (Figure 1, Item 3) hanging off of potentiometer (Figure 1, Item 2).
5. Remove and retain nut (Figure 1, Item 4) that secures potentiometer (Figure 1, Item 2) to control panel (Figure 1, Item 1).
6. Remove potentiometer (Figure 1, Item 2) from control panel (Figure 1, Item 1).
7. Desolder leads (Figure 1, Item 3) from potentiometer (Figure 1, Item 2). Disconnect leads (Figure 1, Item 3) and set aside.

END OF TASK

REPLACEMENT

NOTE

If wires/terminals to be soldered to potentiometer are not usable, fabricate new leads using (16 AWG) wire and appropriate terminal.

If necessary, tin joints on potentiometer and clean with alcohol in preparation to receive solder.

1. Strip, tin and prep leads (Figure 1, Item 3) for soldering.
2. Place heat shrink over prepared leads (Figure 1, Item 3). Form J-hook with tinned wire.
3. Solder leads (Figure 1, Item 3) to terminals on potentiometer (Figure 1, Item 2) (see Figure 1) and allow to cool.
4. Remove excess flux with acid brush and isopropyl alcohol and inspect joints.
5. Slide heat shrink over soldered joints and apply heat using heat gun.
6. Insert potentiometer (Figure 1, Item 2) into control panel (Figure 1, Item 1) (terminals towards edge of control panel) and secure using nut (Figure 1, Item 4). Secure wiring to control panel (Figure 1, Item 1) using strap-ties.
7. Close control panel (Figure 1, Item 1) and secure.
8. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

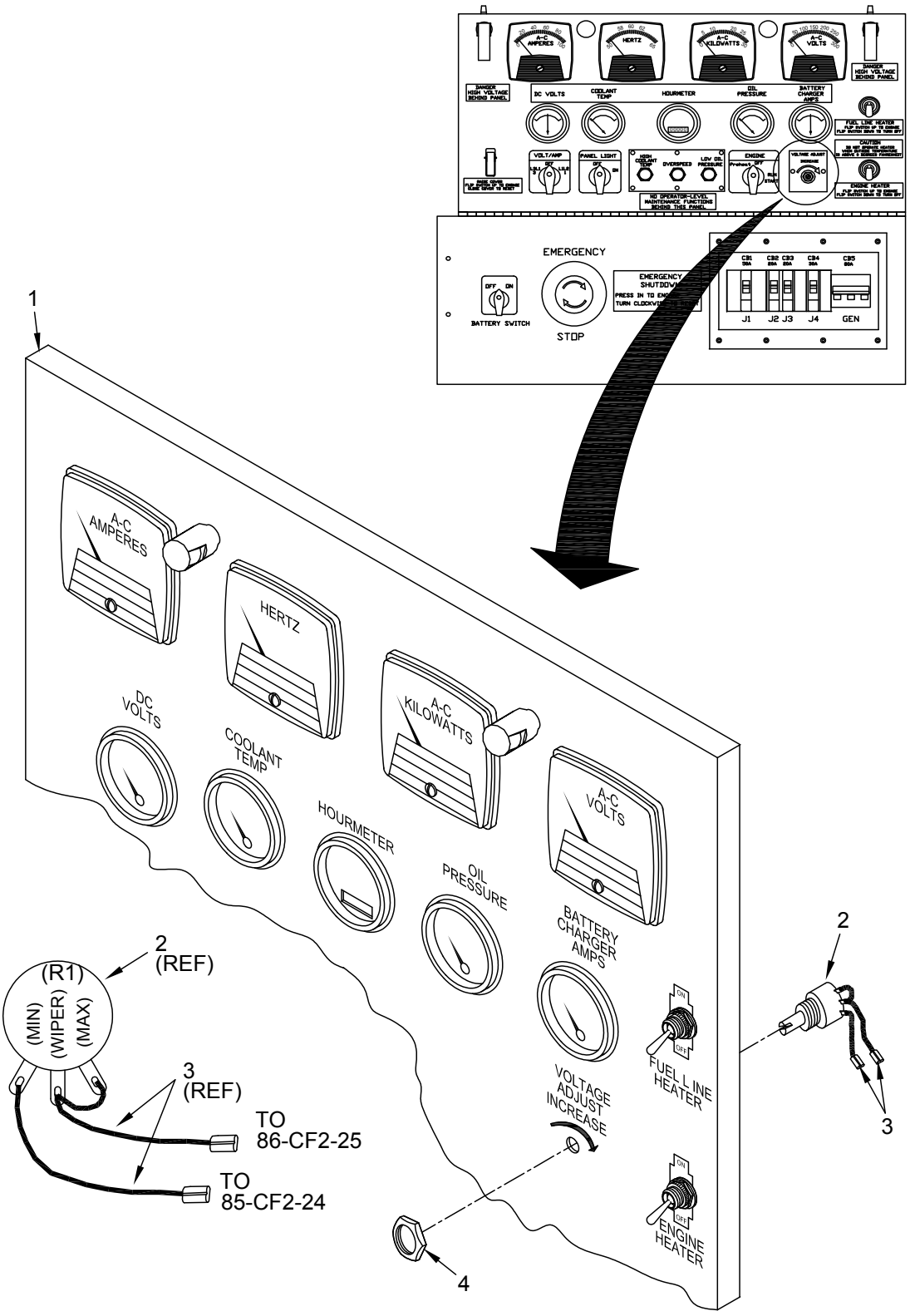


Figure 1. Potentiometer Removal/Replacement.

END OF TASK

ROTARY SWITCHES REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
Switch(es)

Personnel Required
One

Reference
WP 0005, WP 0041

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure covers the following assemblies:
- VOLT/AMP rotary switch
- PANEL LIGHT rotary switch
- ENGINE rotary switch

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY rotary switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel (Figure 2, Item 1), allow control panel (Figure 2, Item 1) to drop down and hang from lanyards. Remove any strap-ties securing associated wiring harness to control panel (Figure 2, Item 1).
4. Remove and retain screw (Figure 2, Item 7) and knob (Figure 2, Item 6) from rotary switch being replaced.
5. Carefully pry off silver cover (Figure 2, Item 5) exposing mounting plate (Figure 2, Item 3) and four screws (Figure 2, Item 4) that secure rotary switch (Figure 2, Item 2) to control panel (Figure 2, Item 1).
6. Remove and retain four mounting screws (Figure 2, Item 4) that secure mounting plate (Figure 2, Item 3) and rotary switch (Figure 2, Item 2) to control panel (Figure 2, Item 1).
7. Remove and retain mounting plate (Figure 2, Item 3) from control panel (Figure 2, Item 1).

REMOVAL - Continued

NOTE

Be observant of jumpers on rotary switches. Ensure they do not fall out when hardware is loosened.

8. Remove rotary switch (Figure 2, Item 2) being observant of orientation and positioning on control panel. (Figure 2, Item 2).

9. Loosen but do not remove hardware securing terminal leads to rotary switch (Figure 2, Item 2). Remove wiring from rotary switch (Figure 2, Item 2) and re-tighten hardware.

END OF TASK

REPLACEMENT

NOTE

If necessary, refer to (Table 1) or (FO-6 through FO-13) for electrical schematics and wiring diagrams.

Be observant of jumpers on rotary switches. Ensure they are in the proper locations on the switch.

1. Loosen but do not remove hardware securing terminal leads to rotary switch (Figure 2, Item 2). Install terminals from wiring harness to appropriate terminals on rotary switch (Figure 2, Item 2) and re-tighten hardware.

2. Insert rotary switch (Figure 2, Item 2) being observant of orientation and positioning through rear of control panel (Figure 2, Item 1).

3. Place mounting plate (Figure 2, Item 3) on front of control panel (Figure 2, Item 1) and loosely install four mounting screws (Figure 2, Item 4). Once hardware is aligned, tighten four mounting screws (Figure 2, Item 4)

4. Install silver cover (Figure 2, Item 5) onto mounting plate (Figure 2, Item 3).

5. Install knob (Figure 2, Item 6) onto rotary switch (Figure 2, Item 2) and secure with screw (Figure 2, Item 7).

6. Close control panel (Figure 1, Item 1) and secure.

7. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Genset Control Panel - Rotary Switch Connections.

SWITCH ID	SCHEMATIC ID	SWITCH TERMINAL	HARNESS ID	JUMPERS
VOLT/AMP	SW1	1	71-CF2-17	
		2	no connection	
		3	75-M2	
		4		Jumper to pin #8
		5	73-CF2-19	
		6	84-M4	
		7	72-CF2-18	
		8	83-M4	Jumper to pin #4
		9	no connection	
		10	no connection	
		11		Jumper to pin #19
		12		Jumper to pin #16
		13	79-M1	Jumper to pin #17
		14	67-CF2-14	
		15	no connection	
		16	69-CF2-16	Jumper to pin #12
		17		Jumper to pin #13
		18	no connection	
		19	78-M1	Jumper to pin #11
		20	68-CF2-15	
PANEL LIGHT	SW2 (PLS)	1	23-SW3-11	
			38-M9	
		2	24-L1, L2	
		3	no connection	
		4	no connection	
ENGINE	SW3 (ESS)	1	1-CF2-2	
		2	20-CF2-7	
		3		Jumper to pin #7
		4	8-CF2-2	
		5	no connection	
		6	30-R2-1	
			31-MS-1	
		7		Jumper to pins #3 and #11
		8	10-CF2-4	
		9		
		10	25-L3-L5	
		11		Jumper to pin #7
		12	9-CG2-3	

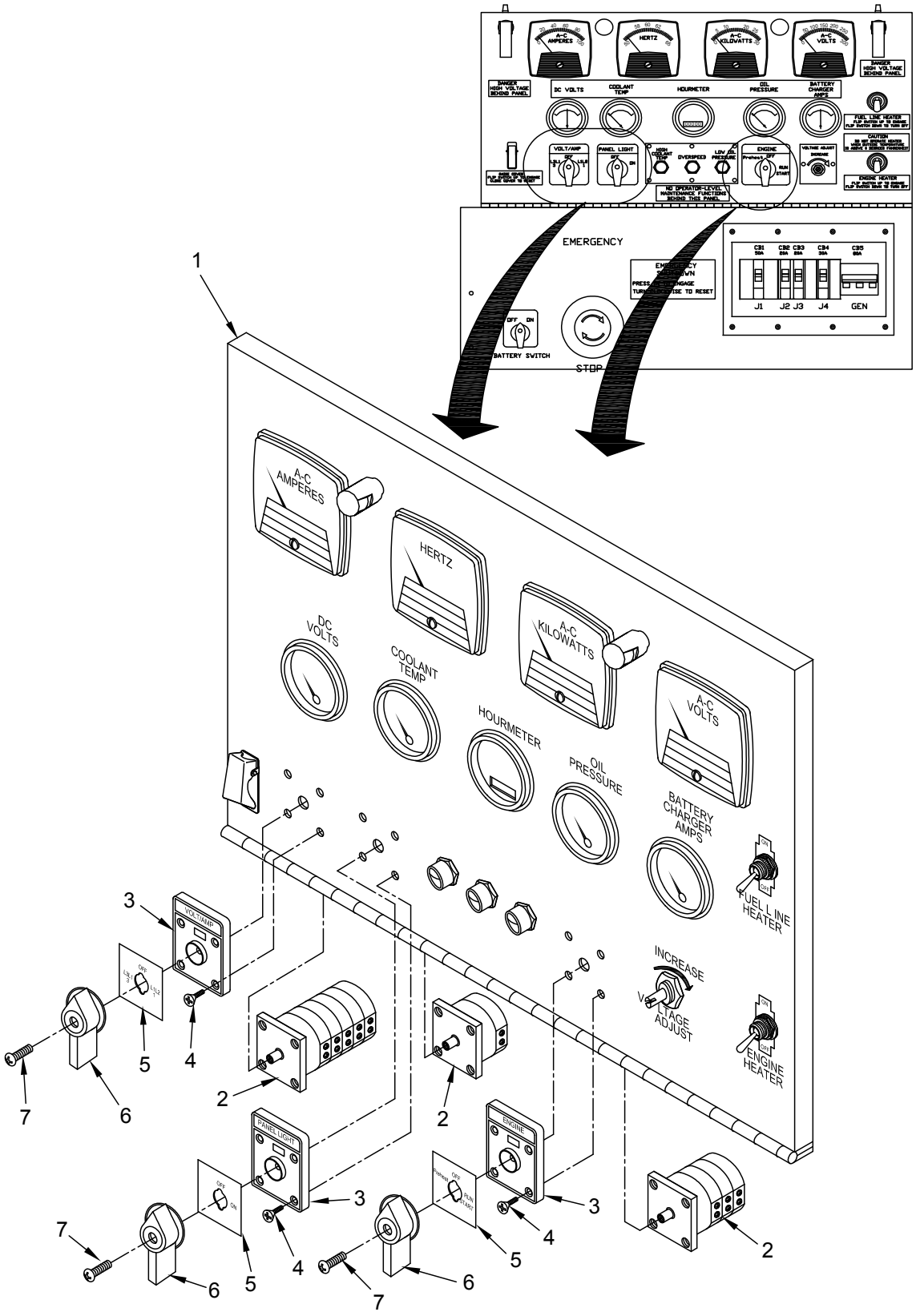


Figure 2. Rotary Switch Removal/Replacement.

END OF TASK

TOGGLE SWITCHES REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Safety glasses

Materials/Parts
Switch(es)

Personnel Required
One

Reference
WP 0005, WP 0041,
FO-6 through FO-13

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

FUEL LINE HEATER/ ENGINE HEATER

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY rotary switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel (Figure 3, Item 1), allow control panel (Figure 3, Item 1) to drop down and hang from lanyards. Remove any strap-ties securing associated wiring harness to control panel (Figure 3, Item 1).
4. Mark and disconnect all wires from toggle switch (Figure 3, Item 2) being observant of terminal association.
5. Remove and retain nut (Figure 3, Item 5) and plate (Figure 3, Item 4) from toggle switch (Figure 3, Item 2) being replaced.
6. Remove toggle switch (Figure 3, Item 2) from control panel (Figure 3, Item 1).

END OF TASK

REPLACEMENT

NOTE

Ensure nut (Figure 3, Item 3) is present on switch (Figure 3, Item 2). If necessary, adjust to allow sufficient threads to protrude through control panel.

1. Install toggle switch (Figure 3, Item 2) into control panel (Figure 3, Item 1) being observant of orientation.
2. Install plate (Figure 3, Item 4) and secure to control panel (Figure 3, Item 1) with nut (Figure 3, Item 5).

NOTE

If necessary, refer to (Table 2) or (FO-6 through FO-13) for electrical schematics and wiring diagrams.

3. Connect all wires to toggle switch (Figure 3, Item 2).
4. Close control panel (Figure 1, Item 1) and secure.
5. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

BATTLE SHORT

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY rotary switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel (Figure 3, Item 1), allow control panel (Figure 3, Item 1) to drop down and hang from lanyards. Remove any strap-ties securing associated wiring harness to control panel (Figure 3, Item 1).
4. Mark and disconnect all wires from toggle switch (Figure 3, Item 9) being observant of terminal association.
5. Remove and retain nut (Figure 3, Item 8), lock washer (Figure 3, Item 7), and guard (Figure 3, Item 6).
6. Remove toggle switch (Figure 3, Item 9) from control panel (Figure 3, Item 1).

END OF TASK

REPLACEMENT

NOTE

Ensure nut (Figure 3, Item 3) is present on switch (Figure 3, Item 9). If necessary, adjust to allow sufficient threads to protrude through control panel.

1. Install toggle switch (Figure 3, Item 9) into control panel (Figure 3, Item 1) being observant of orientation.
2. Install guard (Figure 3, Item 6) and secure to control panel (Figure 3, Item 1) with lock washer (Figure 3, Item 7) and nut (Figure 3, Item 8)

NOTE

If necessary, refer to (Table 2) or (FO-6 through FO-13) for electrical schematics and wiring diagrams.

Once BATTLE SHORT switch is installed, multimeter should read short (0Ω) when BATTLE SHORT switch is in the up position

3. Connect all wires to toggle switch (Figure 3, Item 9).
4. Close control panel (Figure 3, Item 1) and secure.
5. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 2. Genset Control Panel - Toggle Switch Connections.

SWITCH ID	SCHEMATIC ID	SWITCH TERMINAL	HARNESS ID
BATTLE SHORT	SW5	1	29B-CF2-31
		2	1B-CF2-30
ENGINE HEAT	SW6	1	425-SW8-1
		2	424-SW8-2
		3	BK-CF2-33
		4	GN-CF2-35
FUEL LINE HEAT	SW8	1	425-SW6-1
			50B-M8-G
		2	424-SW6-2
			RD-CF-34
		3	50-CF-36
		4	425-SW8-3-4

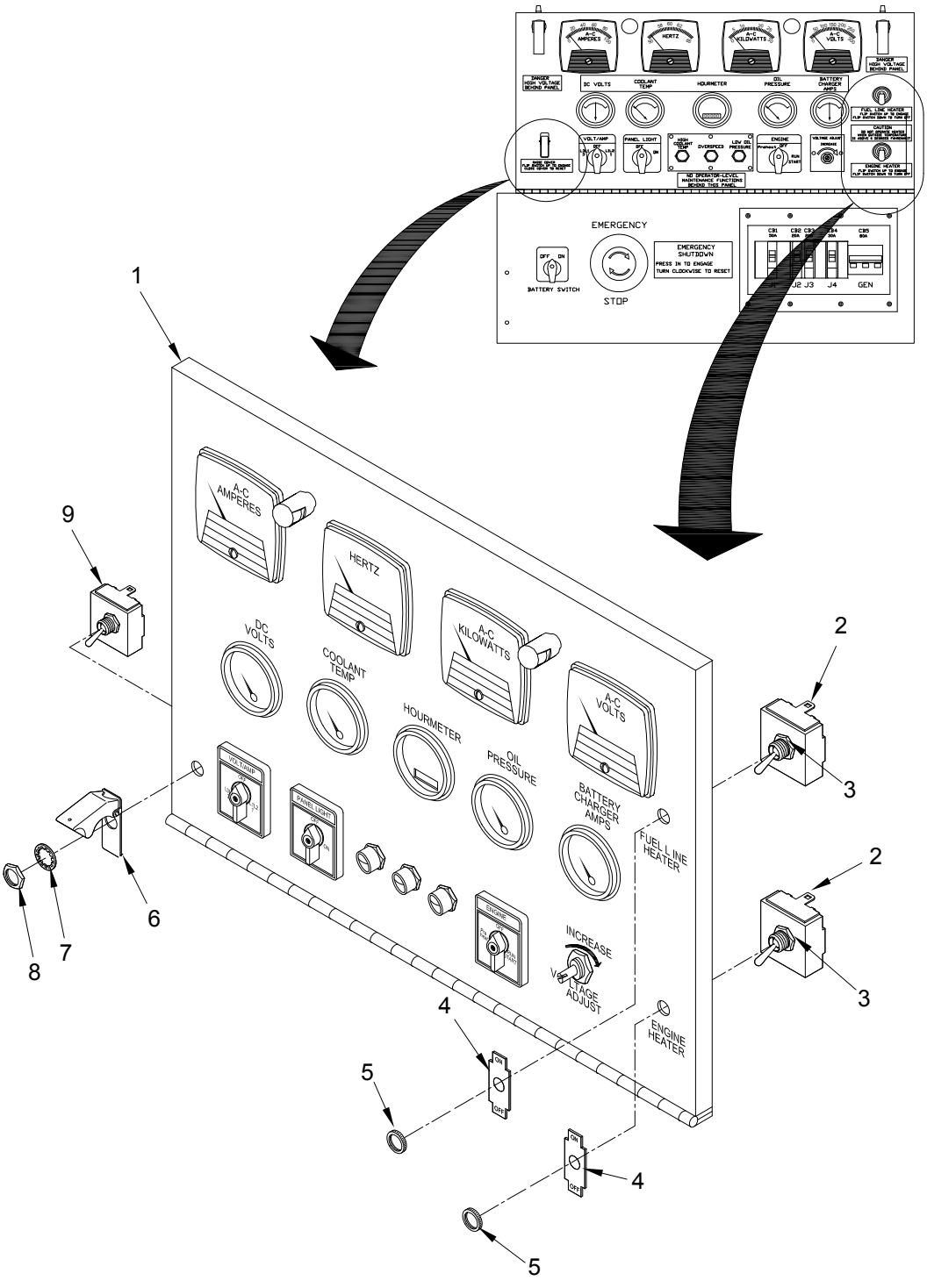


Figure 3. Toggle Switch Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
CONTROL PANEL – LIGHTS

GENERAL

This work package provides information on the removal and replacement of components on the Genset control panel. They consist of:

- Panel lights
- HIGH COOLANT TEMP light
- OVERSPEED light
- LOW OIL PRESSURE light

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-13) for electrical schematics and wiring diagrams.

PANEL LIGHTS REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Panel light

Personnel Required
One

Reference
WP 0005, WP 0041,
FO-6 through FO-13

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel (Figure 1, Item 1). Allow control panel (Figure 1, Item 1) to drop down and hang from lanyards.
4. Mark and disconnect terminal coming from panel light (Figure 1, Item 12) from wiring harness.
5. Remove and retain nut (Figure 1, Item 3) and lock washer (Figure 1, Item 2) that secures panel light (Figure 1, Item 12) to control panel (Figure 1, Item 1).
6. Remove panel light (Figure 1, Item 12) from control panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

NOTE

If necessary, remove cover (Figure 1, Item 10) and bulb (Figure 1, Item 11) from old panel light and install onto new panel light.

1. Insert panel light (Figure 1, Item 12) through front of control panel (Figure 1, Item 1).
2. Secure using nut (Figure 1, Item 3) and lock washer (Figure 1, Item 2).
3. Connect terminal from panel light (Figure 1, Item 12) to wiring harness.
4. Close control panel (Figure 1, Item 1) and secure.

REPLACEMENT - Continued

5. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

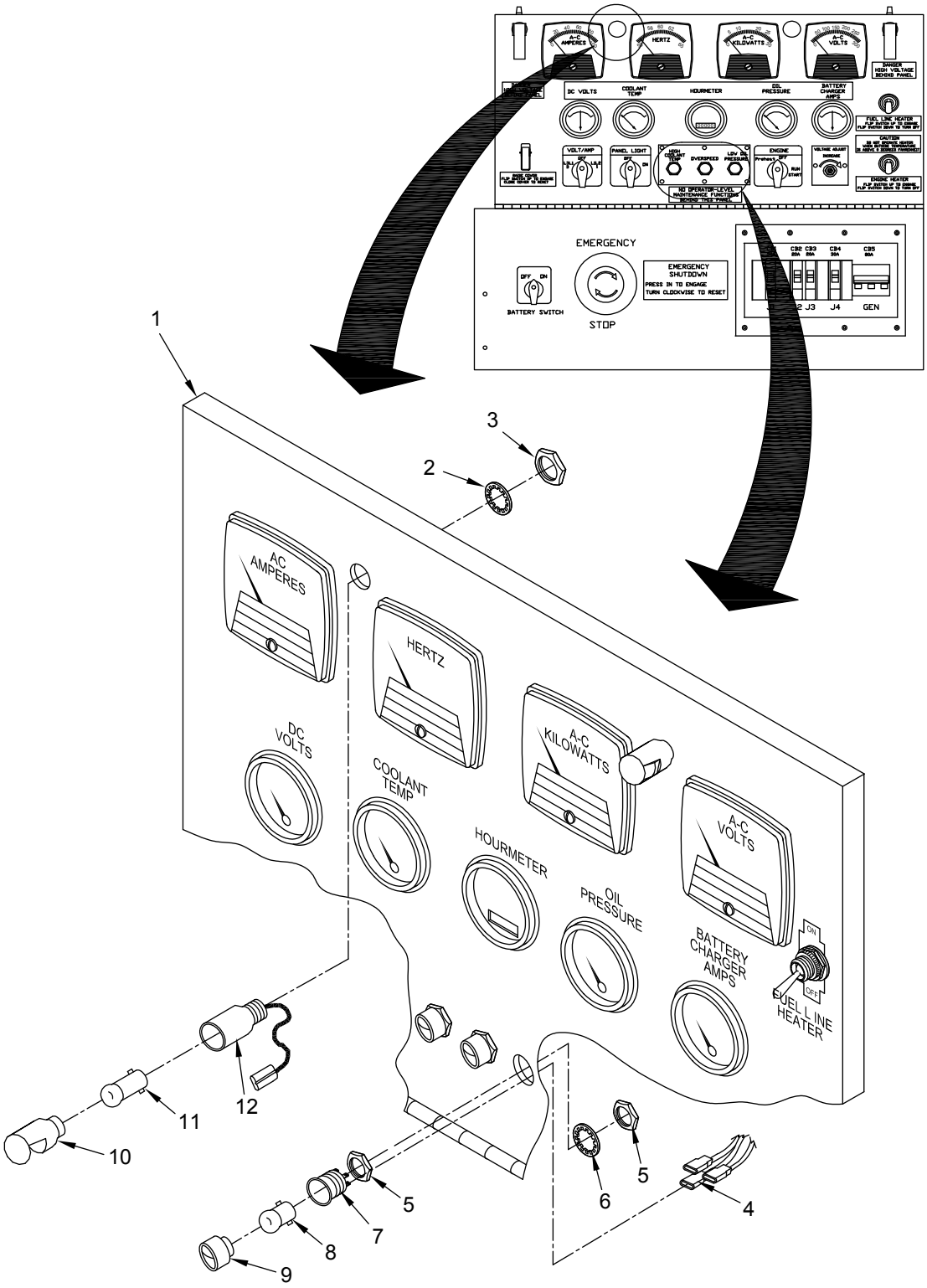


Figure 1. Light Assemblies Removal/Replacement.

END OF TASK

INDICATOR LIGHTS REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Indicator light

Personnel Required
One

Reference
WP 0005, WP 0041, FO-6 through FO-13

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure covers the following assemblies:
- HIGH COOLANT TEMP light
- OVERSPEED light
- LOW OIL PRESSURE light

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel (Figure 1, Item 1). Allow control panel (Figure 1, Item 1) to drop down and hang from lanyards.
4. Mark and disconnect three terminals (Figure 1, Item 4) coming from wiring harness from indicator light (Figure 1, Item 7).
5. Remove and retain nut (Figure 1, Item 5) and lock washer (Figure 1, Item 6) that secures indicator light (Figure 1, Item 7) to control panel (Figure 1, Item 1).
6. Remove indicator light (Figure 1, Item 7) from control panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

NOTE

If necessary, remove cover (Figure 1, Item 9) and bulb (Figure 1, Item 8) from old indicator light (Figure 1, Item 7) and install onto new indicator light (Figure 1, Item 7).

1. Insert indicator light (Figure 1, Item 7) through front of control panel (Figure 1, Item 1).
2. Secure using nut (Figure 1, Item 5) and lock washer (Figure 1, Item 6).

NOTE

If necessary, refer to (Table 1) or (FO-6 through FO-13) for electrical schematics and wiring diagrams.

3. Connect three terminals (Figure 1, Item 4) from wiring harness indicator light (Figure 1, Item 7).
4. Close control panel (Figure 1, Item 1) and secure.
5. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Indicator Light(s) Connections.

INDICATOR LIGHT ID	SCHEMATIC ID	TERMINAL CONNECTIONS		
		1	2	3
HIGH COOLANT TEMP	L 3	45-M6-G	34-CF2-9	25-SW3-9
LOW OIL PRESSURE	L 4	46-M8-G	35-CF2-10	25-SW3-9
OVERSPEED	L 5	47-M8-G	36-CF2-11	25-SW3-9

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET CONTROL PANEL – SWITCHES

GENERAL

This work package provides information on the removal and replacement of components on the Genset control panel. They consist of:

- BATTERY SWITCH
- EMERGENCY STOP

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

BATTERY SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Switch

Personnel Required
One

Reference
WP 0005, WP 0041

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

BATTERY SWITCH

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Remove and retain eight screws (Figure 1, Item 14), lock washers (Figure 1, Item 13), and flat washers (Figure 1, Item 12) from circuit breaker cover plate (Figure 1, Item 11). Remove and retain circuit breaker cover plate (Figure 1, Item 11) from control panel (Figure 1, Item 1).
4. Remove and retain two countersunk screws (Figure 1, Item 17) from control panel (Figure 1, Item 1).
5. Remove and retain four screws (Figure 1, Item 22), lock washers (Figure 1, Item 23), and flat washers (Figure 1, Item 24) that secure control panel (Figure 1, Item 1) to Genset.
6. Raise control panel (Figure 1, Item 1) to gain access to electrical connections on switch (Figure 1, Item 2). Remove and retain two nuts (Figure 1, Item 4) and lock washers (Figure 1, Item 3) that secure electrical connections (Figure 1, Item 5) to switch (Figure 1, Item 2).
7. Mark and remove wiring harness terminals (Figure 1, Item 5) from switch (Figure 1, Item 2).
8. Remove and retain screw (Figure 1, Item 18) and knob (Figure 1, Item 19) from switch (Figure 1, Item 2).
9. Remove and retain nut (Figure 1, Item 20) and lock washer (Figure 1, Item 21). Remove switch (Figure 1, Item 3) from control panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

1. Insert switch (Figure 1, Item 2) through control panel (Figure 1, Item 1) and secure using lock washer (Figure 1, Item 21) and nut (Figure 1, Item 20).

2. Place knob (Figure 1, Item 19) onto switch (Figure 1, Item 2) and secure with screw (Figure 1, Item 18).

3. Connect wiring harness terminals (Figure 1, Item 5) to switch (Figure 1, Item 2) and secure using two nuts (Figure 1, Item 4) and lock washers (Figure 1, Item 3).

4. Align two countersunk screws (Figure 1, Item 15) with clips (Figure 1, Item 10) and secure control panel (Figure 1, Item 1) to barrier panel.

5. Install circuit breaker cover plate (Figure 1, Item 11) and secure to control panel (Figure 1, Item 1) using eight screws (Figure 1, Item 14), lock washers (Figure 1, Item 13), and flat washers (Figure 1, Item 12).

6. Secure control panel (Figure 1, Item 1) to Genset using four screws (Figure 1, Item 22), lock washers (Figure 1, Item 23), and flat washers (Figure 1, Item 24).

7. Connect negative terminal to battery (see WP 0041). Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

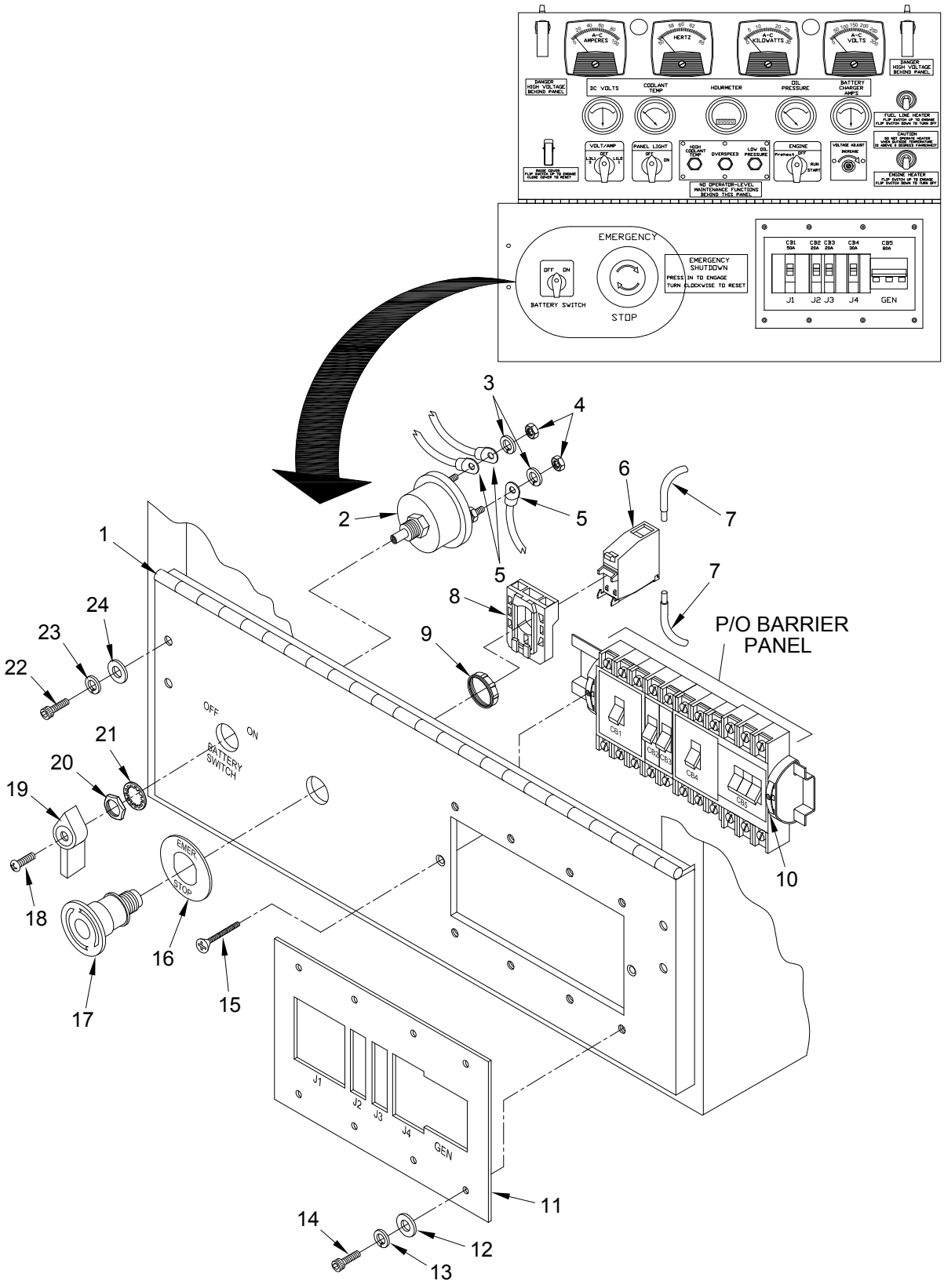


Figure 1. Battery Switch Removal/Replacement.

END OF TASK

EMERGENCY STOP SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Switch

Personnel Required
One

Reference
WP 0005, WP 0041

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

EMEREGENCY STOP

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Remove and retain eight screws (Figure 1, Item 15), lock washers (Figure 1, Item 14), and flat washers (Figure 1, Item 13) from circuit breaker cover plate (Figure 1, Item 12). Remove and retain circuit breaker cover plate (Figure 1, Item 12) from control panel (Figure 1, Item 1).
4. Remove and retain two countersunk screws (Figure 1, Item 16) from control panel (Figure 1, Item 1).
5. Remove and retain four screws (Figure 1, Item 22), lock washers (Figure 1, Item 23) and flat washers (Figure 1, Item 24) that secure control panel (Figure 1, Item 1) to Genset.
6. Raise control panel (Figure 1, Item 1) to gain access to electrical connections on switch (Figure 1, Item 9).
7. Loosen but do not remove two screws securing electrical connections (Figure 1, Item 10) to switch (Figure 1, Item 9).
8. Mark and remove electrical connections (Figure 1, Item 10) from switch (Figure 1, Item 9).
9. Remove and retain switch (Figure 1, Item 9) by prying up on metal latch of switch (Figure 1, Item 9).
10. Remove and retain bracket (Figure 1, Item 8) by expanding metal clamp with small screw driver.

REMOVAL - Continued

11. Remove and retain mounting nut (Figure 1, Item 7).

12. Remove plunger (Figure 1, Item 18) and label (Figure 1, Item 17) from front of control panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

1. Insert plunger (Figure 1, Item 18) through label (Figure 1, Item 17) and control panel (Figure 1, Item 1). Secure using mounting nut (Figure 1, Item 7).

2. Expand metal clamp of bracket (Figure 1, Item 8) with small screw driver and install onto plunger (Figure 1, Item 18).

3. Orientate and install switch (Figure 1, Item 9) onto bracket (Figure 1, Item 8).

4. Connect wiring harness terminals (Figure 1, Item 10) to switch (Figure 1, Item 9) and secure by tightening set screws.

5. Align two countersunk screws (Figure 1, Item 16) with clips (Figure 1, Item 11) and secure control panel (Figure 1, Item 1) to barrier panel.

6. Install circuit breaker cover plate (Figure 1, Item 12) and secure to control panel (Figure 1, Item 1) using eight screws (Figure 1, Item 15), lock washers (Figure 1, Item 14), and flat washers (Figure 1, Item 13).

7. Secure control panel (Figure 1, Item 1) to Genset using four screws (Figure 1, Item 22), lock washers (Figure 1, Item 23) and flat washers (Figure 1, Item 24).

8. Connect negative terminal to battery (see WP 0041). Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET – CONTROL PANEL

GENERAL

This work package provides information on the removal and replacement of components on the Genset control panel. It consists of:

- Control panel wiring harness removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

CONTROL PANEL WIRING HARNESS REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Safety glasses

Materials/Parts
Wiring harness
Strap-ties (WP 0168, Item 55 to 57)

Personnel Required
One

Reference
WP 0005, WP 0041
FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

NOTE

If necessary, refer to (Figure 1) for component location and to (Figures FO-6 through FO-12) for electrical schematic/wiring diagrams.

Replacing the entire wiring harness should be a last resort. Always attempt to replace individual terminals or individual wires before doing a total replacement of the wiring harness.

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Remove and retain nuts and lock washers that secure wiring harness to all AC meters (A-C- AMPERES, HERTZ, A-C KILOWATTS, A-C VOLTS) on control panel.
5. Mark and disconnect all wiring harness terminals from all AC meters of control panel.
6. Remove and retain nuts and lock washers that secure wiring harness to gauges (COOLANT TEMP and OIL PRESSURE) and remaining meters (DC VOLTS, HOURMETER and BATTERY CHARGER AMPS) on control panel.
7. Mark and disconnect all wiring harness terminals from gauges and meters of control panel.
8. Loosen but do not remove hardware that secures wiring harness terminals to rotary switches (VOLT/AMP, PANEL LIGHT and ENGINE).

REMOVAL - Continued

9. Mark and disconnect all wiring harness terminals from rotary switches on control panel.

10. Disconnect all wiring harness terminals from toggle switches (BATTLE SHORT, ENGINE HEATER and FUEL LINE HEATER) on control panel.

11. Disconnect leads coming off of VOLTAGE ADJUST potentiometer from wiring harness.

12. Disconnect leads coming off of panel lights, HIGH COOLANT TEMP, OVERSPEED, and LOW OIL PRESSURE from wiring harness.

13. Disconnect wiring harness connector CF2 from mating plug.

14. Remove all strap ties securing wiring harness to control panel and remove wiring harness.

END OF TASK

REPLACEMENT

NOTE

If necessary, refer to (Figure 1) for component location and to (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

1. Inspect new wiring harness for completeness. Verify that all terminals are present, wiring harness is not damaged and CF2 connector is complete.

2. Lay wiring harness onto control panel and loosely strap tie into place.

3. Connect appropriate wiring harness leads to panel lights, HIGH COOLANT TEMP, OVERSPEED, and LOW OIL PRESSURE lights.

4. Connect appropriate wiring harness leads coming off of VOLTAGE ADJUST potentiometer.

5. Connect appropriate wiring harness leads to toggle switches (BATTLE SHORT, ENGINE HEATER and FUEL LINE HEATER).

6. Connect appropriate wiring harness leads to rotary switches (VOLT/AMP, PANEL LIGHT and ENGINE) and tighten all set screws.

7. Connect appropriate wiring harness leads to gauges (COOLANT TEMP and OIL PRESSURE) and meters (DC VOLTS, HOURMETER and BATTERY CHARGER AMPS) and install all associated hardware.

8. Connect appropriate wiring harness leads to AC meters (A-C- AMPERES, HERTZ, A-C KILOWATTS, A-C VOLTS) and install all associated hardware.

9. Connect CF2 connector to mating end.

10. Lay wiring harness against control panel and tighten all strap ties.

11. Close and secure control panel to Genset.

12. Connect negative terminal to battery (see WP 0041). Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

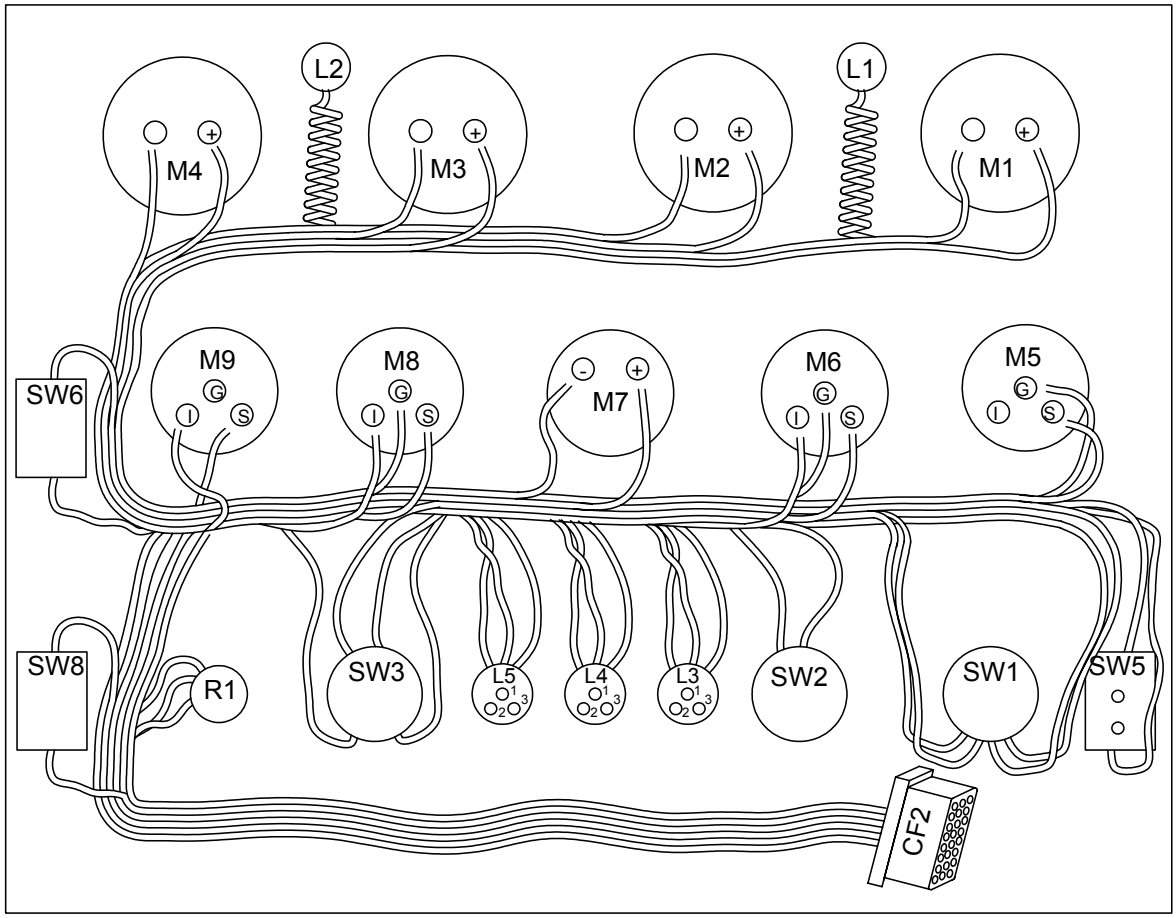


Figure 1. Control Panel Component Identification.

Table 1. Component Identification.

Component Identifier	Control Panel Marking	Component Identifier	Control Panel Marking
M1	A-C- AMPERES meter	SW1	VOLT/AMP switch
M2	HERTZ meter	SW2	PANEL LIGHT switch
M3	A-C KILOWATTS meter	SW3	ENGINE switch
M4	A-C VOLTS meter	SW5	BATTLE SHORT switch
M5	DC VOLTS meter	SW6	FUEL LINE HEATER switch
M6	COOLANT TEMP gauge	SW8	ENGINE HEATER switch
M7	HOURMETER meter		
M8	OIL PRESSURE gauge	L1	Panel light
M9	BATTERY CHARGER AMPS meter	L2	Panel light
		L3	HIGH COOLANT TEMP light
R1	VOLTAGE ADJUST potentiometer	L4	OVERSPEED light
		L5	LOW OIL PRESSURE light
CF2	Cable connector		

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET – POWER DISTRIBUTION PANEL CONNECTORS AND PANEL LIGHTS

GENERAL

This work package provides information on the removal and replacement of components on the Genset control panel. They consist of:

- Power distribution panel lights removal/replacement
- Power distribution panel J1 and J4 connector removal/replacement
- Power distribution panel J2 and J3 connector removal/replacement
- Power distribution panel J5 connector removal/replacement
- Power distribution panel J6 connector removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

POWER DISTRIBUTION PANEL LIGHTS REMOVAL/REPLACEMENT (Old Version)

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Panel light

Personnel Required
One

Reference
WP 0005, WP 0041, FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is applicable to all lights on the power distribution panel.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. If necessary, raise door and latch in open position.
4. If necessary, disconnect all cables from power distribution panel (Figure 1, Item 1).
5. Remove and retain 12 bolts (Figure 1, Item 7) and flat washers (Figure 1, Item 6) that secure power distribution panel (Figure 1, Item 1) to Genset.
6. Remove power distribution panel (Figure 1, Item 1) and lay face down.
7. Slide wire cover (Figure 1, Item 4) off of light (Figure 1, Item 12) being replaced.
8. Mark and disconnect three terminals (Figure 1, Item 5) from light (Figure 1, Item 12) being replaced.
9. Remove and retain nut (Figure 1, Item 3) and lock washer (Figure 1, Item 2) that secures light (Figure 1, Item 12) to power distribution panel (Figure 1, Item 1).
10. Remove indicator light (Figure 1, Item 12) from power distribution panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

NOTE

Inspect all terminals and associated wires. If necessary replace or repair.

1. Adjust nut (Figure 1, Item 10) on indicator light (Figure 1, Item 12) to allow sufficient threads to come though power distribution panel (Figure 1, Item 1).

2. Insert indicator light (Figure 1, Item 12), lock washer (Figure 1, Item 11) and nut (Figure 1, Item 10) through power distribution panel (Figure 1, Item 1).

3. Install nut (Figure 1, Item 3) and lock washer (Figure 1, Item 2) and secure indicator light (Figure 1, Item 11) to power distribution panel (Figure 1, Item 1).

NOTE

If necessary, refer to (FO-6 through FO-12) for electrical schematic.

4. Connect three terminals (Figure 1, Item 5) to light (Figure 1, Item 12) and slide wire cover (Figure 1, Item 4) over connections.

5. Place power distribution panel (Figure 1, Item 1) onto Genset and secure using 12 bolts (Figure 1, Item 7) and flat washers (Figure 1, Item 6).

6. Connect all cables to power distribution panel (Figure 1, Item 1).

7. Connect negative terminal to battery (see WP 0041). Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Genset Power Distribution Panel – Light Connections (Old Version).

LIGHT LOCATION	SCHEMATIC ID	CONNECTION		
		1	2	3
J1 120/208 VOLTS 60 AMP	L6	117-CF3-6	106-CF3-3	149-CF3-9
J2 120 VOLTS 20 AMPERE	L7	117-CF3-6	116-CF3-5	149-CF3-9
J3 120 VOLTS 20 AMPERE	L8	117-CF3-6	126-CF3-7	149-CF3-9
J4 120/208 VOLTS 30 AMP	L9	117-CF3-6	128-CF3-8	149-CF3-9
J5 120 VOLTS INPUT	L10	117-CF3-6	99-CF3-1	149-CF3-9

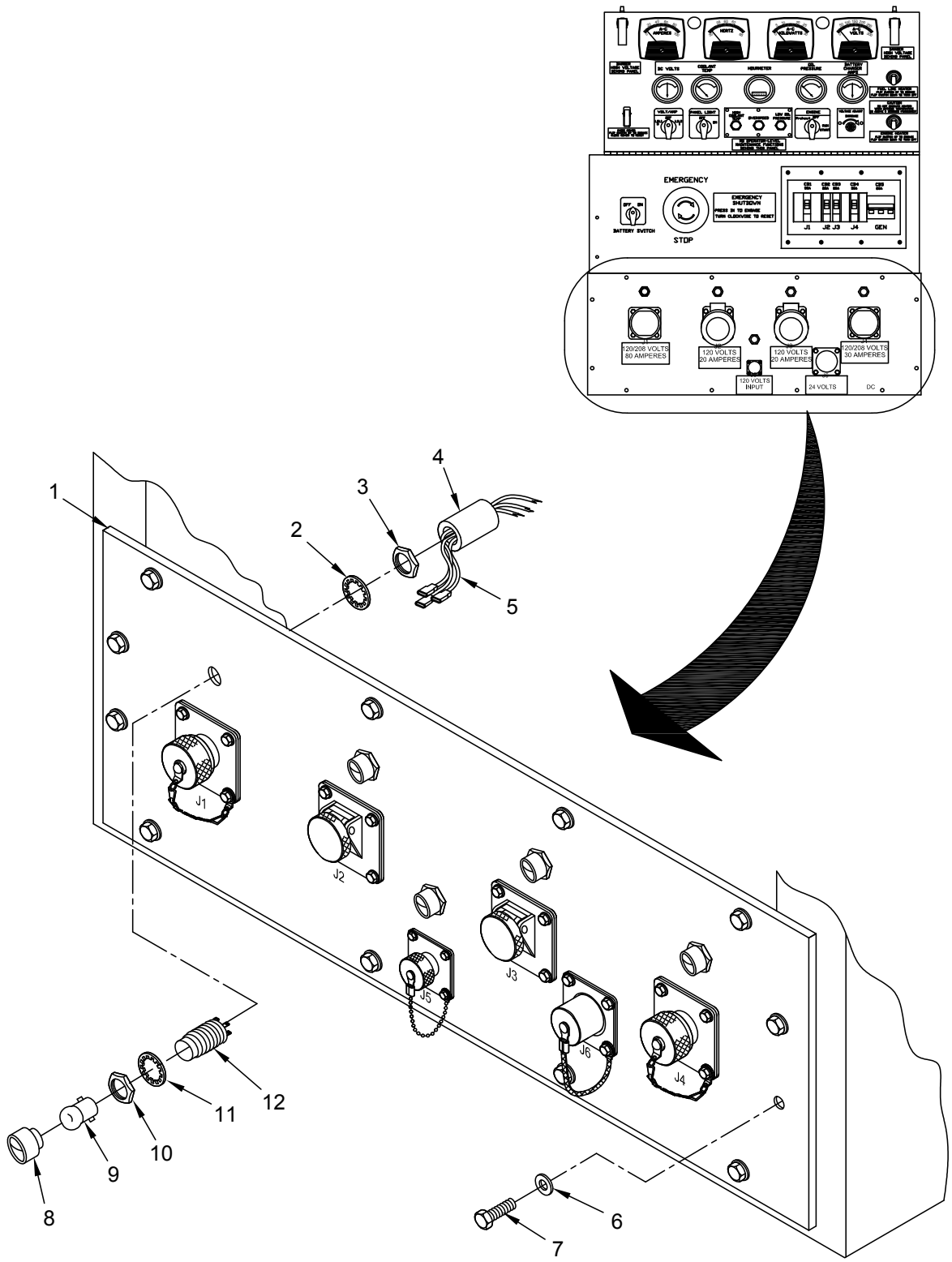


Figure 1. Power Distribution Panel Lights (old version) Removal/Replacement.

END OF TASK

POWER DISTRIBUTION PANEL LIGHTS REMOVAL/REPLACEMENT (New Version)

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Panel light

Personnel Required
One

Reference
WP 0005, WP 0041, FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is applicable to all lights on the new version power distribution panel.

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. If necessary, raise door and latch in open position.
4. If necessary, disconnect all cables from power distribution panel (Figure 2, Item 1).
5. Remove and retain 12 bolts (Figure 2, Item 7) and flat washers (Figure 2, Item 6) that secure power distribution panel (Figure 2, Item 1) to Genset.
6. Remove power distribution panel (Figure 2, Item 1) and lay face down.
7. Slide wire cover (Figure 2, Item 4) off of light (Figure 2, Item 12) being replaced.
8. Mark and disconnect two terminals (Figure 2, Item 5) from light (Figure 2, Item 8) being replaced.
9. Remove and retain nut (Figure 2, Item 3) and metal gasket (Figure 2, Item 2) that secures light (Figure 2, Item 8) to power distribution panel (Figure 2, Item 1).
10. Remove light (Figure 2, Item 8), black out cover (Figure 2, Item 9), and rubber gasket (Figure 2, Item 10) from power distribution panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

NOTE

Inspect all terminals and associated wires. If necessary replace or repair.

1. Insert indicator light (Figure 2, Item 8), Black out cover (Figure 2, Item 9) and Rubber gasket (Figure 2, Item 10) through power distribution panel (Figure 2, Item 1).

2. Install metal gasket (Figure 2, Item 2) and nut (Figure 2, Item 3) and secure indicator light (Figure 2, Item 11) to power distribution panel (Figure 2, Item 1).

NOTE

If necessary, refer to (Table 2) or:
- (Figure FO-15) for schematics (with EMI shielding) (New Version).
- (Figure FO-16) for schematics (without EMI shielding) (New Version).

3. Connect two terminals (Figure 2, Item 5) to indicator light (Figure 2, Item 8) and slide wire cover (Figure 2, Item 4) over connections.

4. Install one side of hinge and secure using two screws and bolts (not shown).

5. Place power distribution panel (Figure 2, Item 1) onto Genset and secure using 12 bolts (Figure 2, Item 7) and flat washers (Figure 2, Item 6).

6. Connect all cables to power distribution panel (Figure 2, Item 1).

7. Connect negative terminal to battery (See WP 0045). Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0006) of this TM.

Table 2. Genset Power Distribution Panel – Light Connections (New Version).

LIGHT LOCATION	SCHEMATIC ID	CONNECTION	
		1	2
J1 120/208 VOLTS 70 AMP	L6	117-CF3-6	106-CF3-3
J2 120 VOLTS 20 AMPERE	L7	117-CF3-6	116-CF3-5
J3 120 VOLTS 20 AMPERE	L8	117-CF3-6	126-CF3-7
J4 120/208 VOLTS 30 AMP	L9	117-CF3-6	128-CF3-8
J5 120 VOLTS INPUT	L10	117-CF3-6	99-110-2

NOTE

The door covering the circuit breakers in (Figure 2) has been removed for clarity.

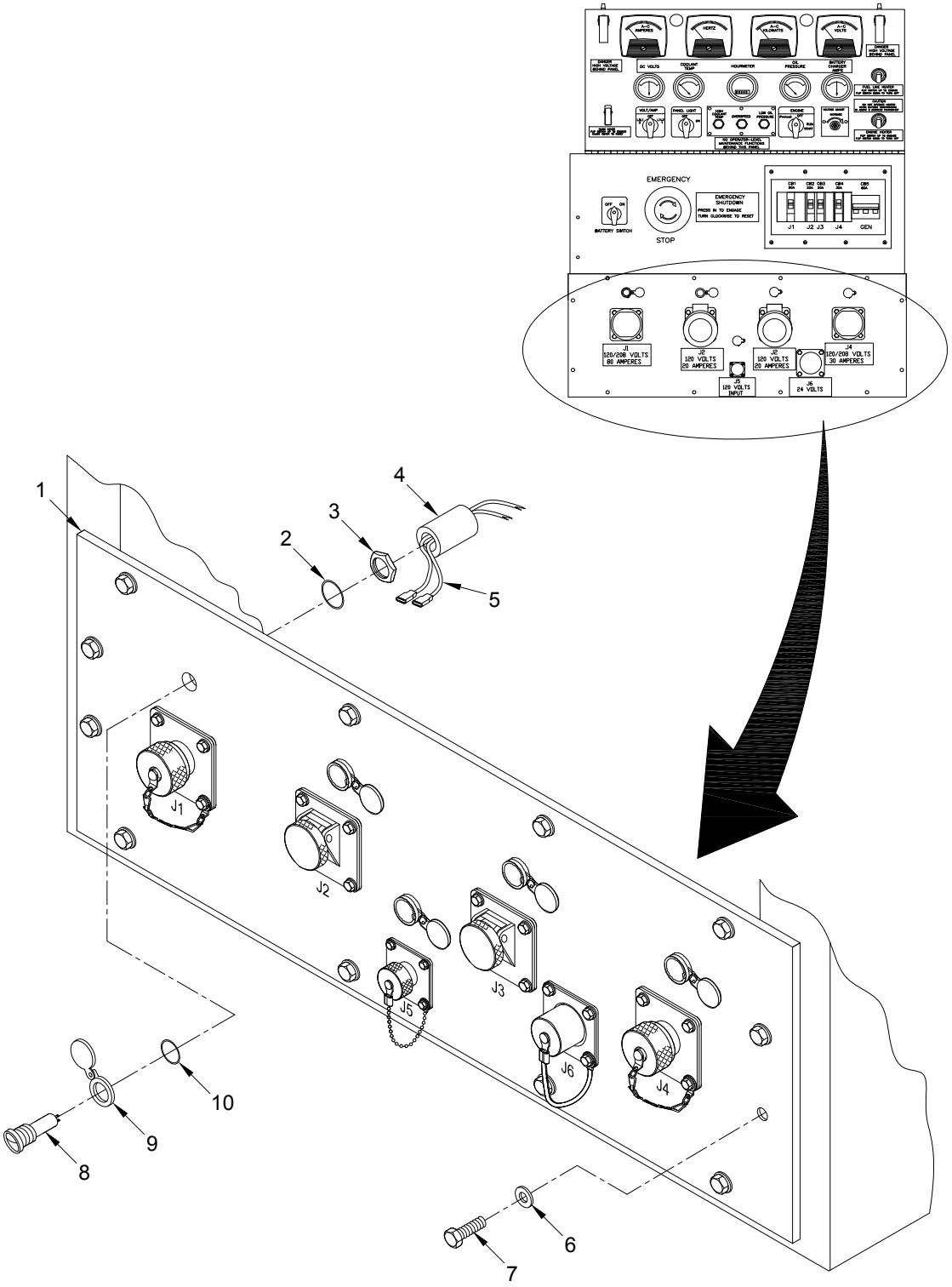


Figure 2. Power Distribution Panel Lights (New Version) Removal/Replacement.

END OF TASK

CONNECTOR (J1 & J4) REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Connector
Gasket

Personnel Required
One

Reference
WP 0005, WP 0041, FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is applicable to both the old and new version (J1 or J4 connectors). For clarity the door protecting the circuit breakers has been removed.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. If necessary, raise door and latch in open position.
4. If necessary, disconnect all cables from power distribution panel (Figure 3, Item 1).
5. Remove and retain 12 bolts (Figure 3, Item 6) and lock washers (Figure 3, Item 5) that secure power distribution panel (Figure 3, Item 1) to Genset.
6. Remove and retain two screws and bolts (not shown) from one side of hinge (Figure 5, Item 2) and lift hinge (Figure 5, Item 2) out of the way.
7. Remove power distribution panel (Figure 3, Item 1) and lay face down.
8. Remove and retain four bolts (Figure 3, Item 9), flat washers (Figure 3, Item 8), nuts (Figure 3, Item 4), lock washers (Figure 3, Item 3) and flat washers (Figure 3, Item 2) that secure connector (J1 or J4) (Figure 3, Item 7), gasket (Figure 3, Item 11) and dust cover (Figure 3, Item 10) to power distribution panel (Figure 3, Item 1).

REMOVAL - Continued

9. Remove connector shell (J1 or J4) (Figure 3, Item 7) from power distribution panel (Figure 3, Item 1) (wires will be attached).

10. Loosen ring (Figure 3, Item 17) from rear of connector shell (Figure 3, Item 12).

11. Slide ring (Figure 3, Item 17) and slide assembly out of connector shell (Figure 3, Item 12).

12. Slide rear insulator (black) (Figure 3, Item 15) and front insulator (red) (Figure 3, Item 13) back to gain access to pins (Figure 3, Item 14) and wiring (Figure 3, Item 16).

NOTE

If replacing connector shell only proceed to step 11 of replacement procedure.

13. Remove pins (Figure 3, Item 14) from associated wires (Figure 3, Item 16).

14. Mark and remove wires (Figure 3, Item 16) from rear insulator (black) (Figure 3, Item 15) and ring (Figure 3, Item 17). Set all pieces aside.

END OF TASK

REPLACEMENT/REPAIR

1. Inspect all wires (Figure 3, Item 16) for nicks, cuts, burn marks or other damage. If necessary replace with appropriate gauge and color of wire.

2. Inspect gasket (Figure 3, Item 11) for damage or excessive wear and tear, if necessary replace.

3. Feed all wires (Figure 3, Item 16) through power distribution panel (Figure 3, Item 1).

4. Insert wires (Figure 3, Item 16) through ring (Figure 3, Item 17) and appropriate holes in rear insulator (black) (Figure 3, Item 15).

5. Install pins (Figure 3, Item 14) onto wires (Figure 3, Item 16) and secure.

6. Insert pins (Figure 3, Item 14) through front insulator (red) (Figure 3, Item 13).

7. Compress rear insulator (black) (Figure 3, Item 15) and front insulator (red) (Figure 3, Item 13) together and insert into connector shell (Figure 3, Item 12). Slide ring (Figure 3, Item 17) forward and tighten.

8. Properly orientate connector assembly (Figure 3, Item 7) to power distribution panel (Figure 3, Item 1) and insert.

NOTE

When performing the following step, do not tighten hardware until all hardware has been installed.

9. Secure connector assembly (Figure 3, Item 7), gasket (Figure 3, Item 11) and dust cover (Figure 3, Item 10) to power distribution panel (Figure 3, Item 1) using four bolts (Figure 2, Item 9), flat washers (Figure 3, Item 8), nuts (Figure 3, Item 4), lock washers (Figure 3, Item 3) and flat washers (Figure 3, Item 2).

10. Place power distribution panel (Figure 3, Item 1) onto Genset and secure using 12 bolts (Figure 3, Item 6), and washers (Figure 3, Item 5).

REPLACEMENT/REPAIR - Continued

11. Install one side of hinge (Figure 5, Item 2) and secure using two screws and bolts (not shown).

12. Connect all cables to power distribution panel (Figure 3, Item 1).

13. Connect negative terminal to battery (see WP 0041). Flatt Genset in accordance with Genset Flatt Procedure (WP 0005) of this TM.

NOTE

If necessary, refer to (Table 3) or (FO-6 through FO-12) for electrical schematics and wiring diagrams.

Refer to Figure 7 for pin layout of J1 and J4.

Table 3. J1 and J4 Connections.

CONNECTOR	CONNECTIONS				
	A	B	C	N	G
J1 120/208 VOLTS 60 AMP	228-CB1-2	229-CB1-4	230-CB1-6	221-PTB2-11	220-GB-16
J4 120 VOLTS 20 AMPERE	252-CB4-2	253-CB4-4	254-CB4-6	255-PTB2-9	251-GB-7

NOTE

For clarity the door protecting the circuit breakers has been removed.

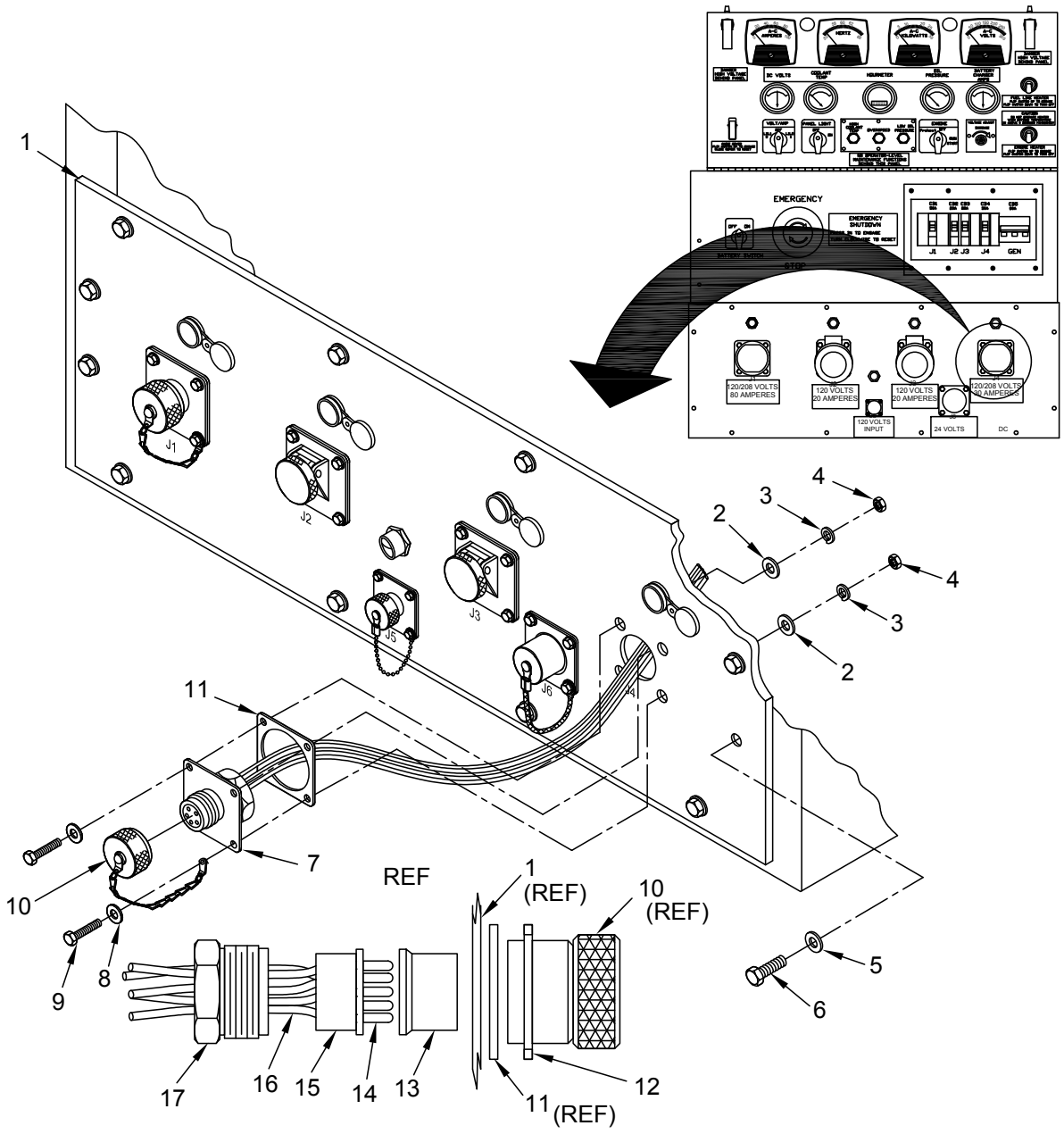


Figure 3. Connector (J1 and J4) Removal/Replacement.

END OF TASK

CONNECTOR (J2 & J3) REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Connector
Gasket

Personnel Required
One

Reference
WP 0005, WP 0041, FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is applicable to both the old and new version (J2 or J3 connectors).

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. If necessary, raise door and latch in open position.
4. If necessary, disconnect all cables from power distribution panel (Figure 4, Item 1).
5. Remove and retain 12 bolts (Figure 4, Item 6) and lock washers (Figure 4, Item 5) that secure power distribution panel (Figure 4, Item 1) to Genset.
6. Remove and retain two screws and bolts (not shown) from one side of hinge (Figure 4, Item 2) and lift hinge (Figure 4, Item 2) out of the way.
7. Remove power distribution panel (Figure 4, Item 1) and lay face down.
8. Remove and retain four bolts (Figure 4, Item 7), flat washers (Figure 3, Item 8), nuts (Figure 4, Item 4), lock washers (Figure 4, Item 3) and flat washers (Figure 4, Item 2) that secure connector (J2 or J3) (Figure 4, Item 9) and gasket (Figure 4, Item 10) to power distribution panel (Figure 4, Item 1).

REMOVAL - Continued

9. Remove connector shell (J2 or J3) (Figure 4, Item 9) from power distribution panel (Figure 4, Item 1) (wires will be attached).

10. Remove screw (Figure 4, Item 14) from rear of connector (Figure 4, Item 9).

11. Slide backplate (Figure 4, Item 12) away from connector (Figure 4, Item 9) to gain access to pins (Figure 4, Item 11) and wiring (Figure 4, Item 13).

12. Remove pins (Figure 4, Item 11) from associated wires (Figure 4, Item 13).

13. Mark and remove wires (Figure 4, Item 13) from backplate (Figure 4, Item 12). Set all pieces aside.

END OF TASK

REPLACEMENT/REPAIR

NOTE

If necessary, refer to (Table 4) and (FO-6 through FO-12) for electrical schematics and wiring diagrams.

Refer to (Figure 7) for pin layout of J2 and J3.

1. Inspect all wires (Figure 4, Item 13) for nicks, cuts, burn marks or other damage. If necessary replace with appropriate gauge and color of wire.

2. Inspect gasket (Figure 4, Item 10) for damage or excessive wear and tear, if necessary replace.

3. Feed all wires (Figure 4, Item 13) through power distribution panel (Figure 4, Item 1).

4. Insert wires (Figure 4, Item 13) through backplate (Figure 4, Item 12).

5. Install pins (Figure 4, Item 11) onto wires (Figure 4, Item 13).

6. Secure backplate (Figure 4, Item 12) using screw (Figure 4, Item 14).

7. Properly orientate connector assembly (Figure 4, Item 9) to power distribution panel (Figure 4, Item 1) and insert.

NOTE

When performing the following step, do not tighten hardware until all hardware has been installed.

8. Secure connector assembly (Figure 4, Item 9), gasket (Figure 4, Item 10) to power distribution panel (Figure 4, Item 1) using four bolts (Figure 4, Item 7), flat washers (Figure 4, Item 8), nuts (Figure 4, Item 4), lock washers (Figure 4, Item 3), and flat washers (Figure 4, Item 2).

9. Place power distribution panel (Figure 4, Item 1) onto Genset and secure using 12 bolts (Figure 4, Item 6), and washers (Figure 4, Item 5).

10. Install one side of hinge (Figure 5, Item 2) and secure using two screws and bolts (not shown).

REPLACEMENT/REPAIR – Continued

11. Connect all cables to power distribution panel (Figure 4, Item 1).

12. Connect negative terminal to battery (see WP 0041). Flatt Genset in accordance with Genset Flatt Procedure (WP 0005) of this TM.

Table 4. J2 and J3 Connections.

CONNECTOR	CONNECTIONS		
	N	L	G
J2 120 VOLTS 20 AMP	108-CF4-3	145-CF4-10	114-CF4-6
J3 120 VOLTS 20 AMP	109-CF4-4	146-CF4-11	115-CF4-7

NOTE

For clarity the door protecting the circuit breakers has been removed.

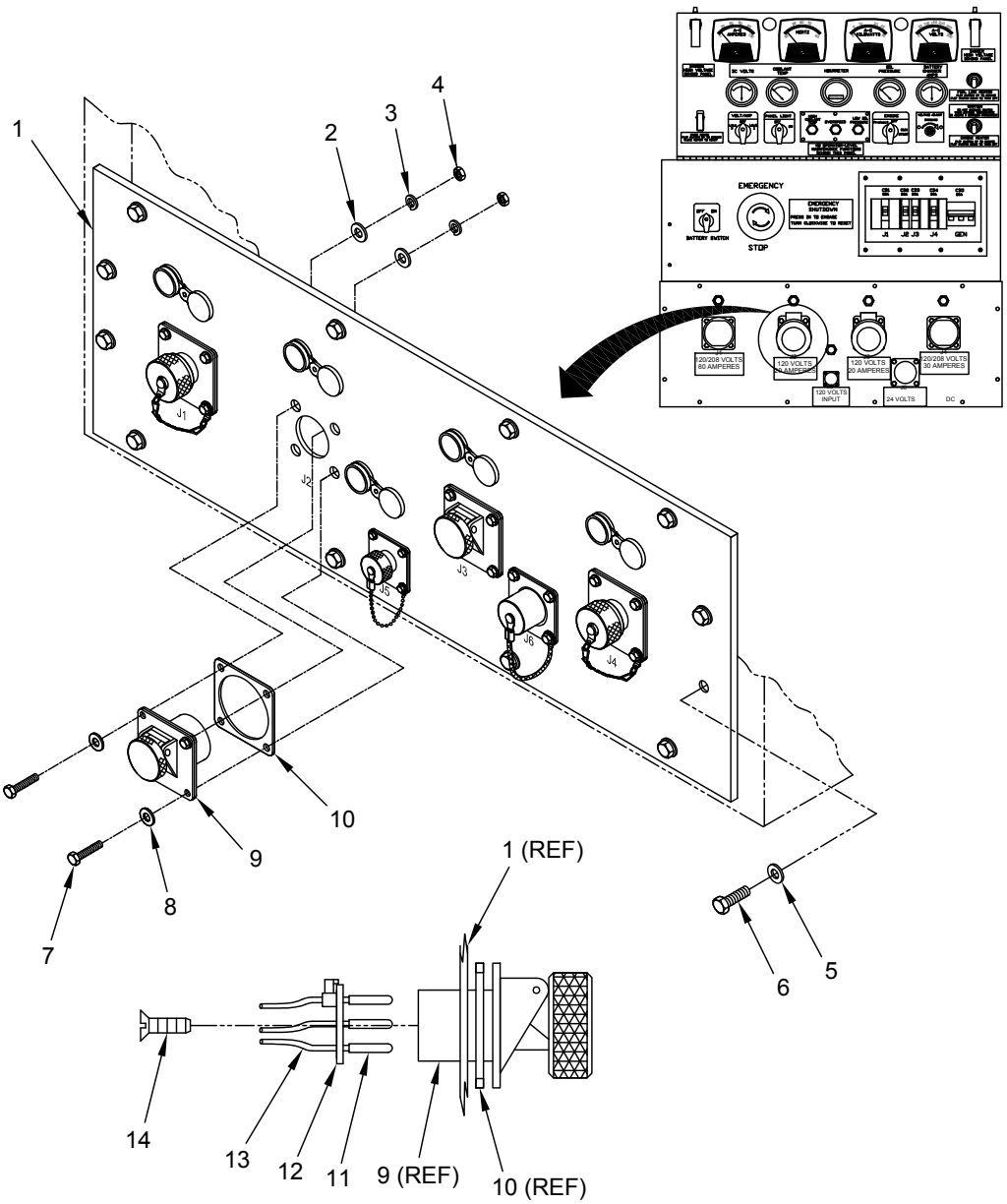


Figure 4. Connector (J2 and J3) Removal/Replacement.

END OF TASK

CONNECTOR (J5) REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Connector
Strap ties (WP 0168, Item 55 to 57)

Personnel Required
One

Reference
WP 0005, WP 0041, FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is applicable to both the old and new version (J5 connector).

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. If necessary, raise door and latch in open position.
4. If necessary, disconnect all cables from power distribution panel (Figure 5, Item 1).
5. Remove and retain twelve bolts (Figure 5, Item 8) and lock washers (Figure 5, Item 9) that secure power distribution panel (Figure 5, Item 1) to Genset.

NOTE

It may be necessary to remove one latch (Figure 5, Item 2) to remove power distribution panel (Figure 5, Item 1).

6. Remove and retain two screws and bolts (not shown) from one side of hinge (Figure 5, Item 2) and lift hinge (Figure 5, Item 2) out of the way.
7. Remove power distribution panel (Figure 5, Item 1) and lay face down.

REMOVAL – Continued

8. Disconnect three terminals (Figure 5, Item 3) from wiring harness (Figure 5, Item 4) and remove strap tie securing wires to power distribution panel (Figure 5, Item 1).

9. Remove and retain four screws (Figure 5, Item 5) that secure connector (Figure 5, Item 6) and dust cover (Figure 5, Item 7) to power distribution panel (Figure 5, Item 1).

10. Remove connector (Figure 5, Item 6) (wires will be attached) from power distribution panel (Figure 5, Item 1).

END OF TASK

REPLACEMENT

NOTE

If necessary, refer to (Table 5) and (FO-6 through FO-12) for electrical schematics and wiring diagrams.

Refer to (Figure 7) for pin layout of J5.

Inspect backside of power distribution panel (Figure 5, Item 1) for four clinch nuts. Ensure that clinch-nuts are securely fastened to power distribution panel (Figure 5, Item 1).

1. Inspect all wires (Figure 5, Items 3 and 4) for nicks, cuts, burn marks, or other damage. If necessary replace with appropriate gauge and color of wire.

2. Feed wires (Figure 5, Item 3) through power distribution panel (Figure 5, Item 1).

3. Connect wires (Figure 5, Item 3) to terminals on chassis wiring harness (Figure 5, Item 4).

4. Properly orientate connector assembly (Figure 5, Item 6) to power distribution panel (Figure 5, Item 1) and insert.

NOTE

When performing the following step, do not tighten hardware until all hardware has been installed.

5. Secure connector assembly (Figure 5, Item 6) and dust cover (Figure 5, Item 7) to power distribution panel (Figure 5, Item 1) using four screws (Figure 5, Item 5).

6. Secure loose wires (Figure 5, Item 3) and chassis wiring harness (Figure 5, Item 4) to power distribution panel (Figure 5, Item 1) using strap ties.

7. Install one side of hinge (Figure 5, Item 2) and secure using two screws and bolts (not shown).

8. Place power distribution panel (Figure 5, Item 1) onto Genset and secure using 12 bolts (Figure 5, Item 8), and washers (Figure 5, Item 9).

REPLACEMENT – Continued

NOTE

If latch (Figure 5, Item 2) was removed, reinstall.

9. Connect all cables to power distribution panel (Figure 5, Item 1).

10. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 5. J5 Connections.

CONNECTOR	CONNECTIONS		
	A	B	C
J5 120 VOLTS INPUT	96-CF4-1	119-CF4-9	98-CF4-2

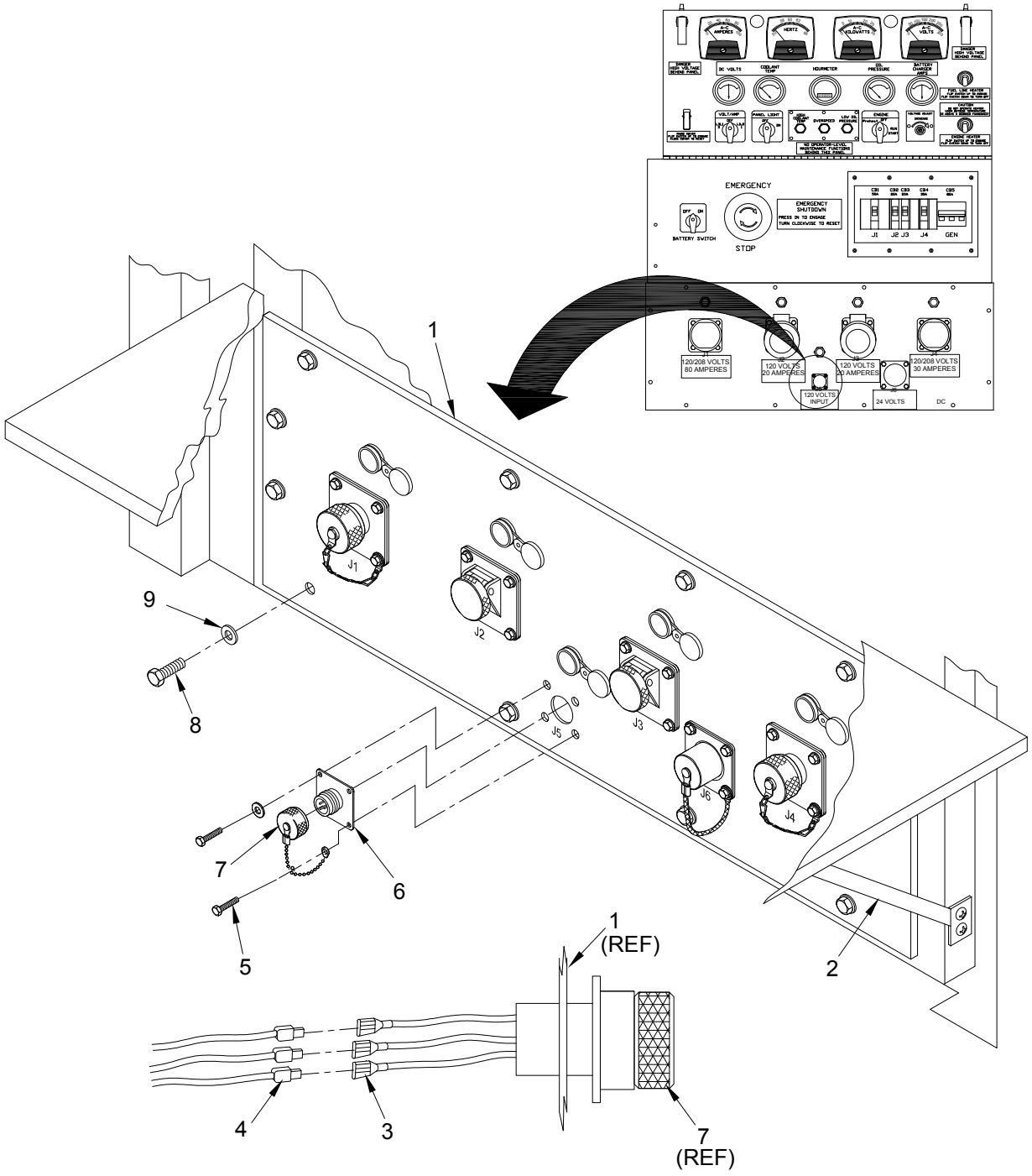


Figure 5. Connector (J5) Removal/Replacement.

END OF TASK

CONNECTOR (J6) REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Reference
WP 0005, WP 0041, FO-6 through FO-12

Materials/Parts
Connector
Gasket

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

Personnel Required
One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is applicable to both the old and new version (J6 connectors).

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. If necessary, raise door and latch in open position.
4. If necessary, disconnect all cables from power distribution panel (Figure 6, Item 1).
5. Remove and retain 12 bolts (Figure 6, Item 13) and lock washers (Figure 6, Item 12) that secure power distribution panel (Figure 6, Item 1) to Genset.
6. Remove and retain two screws and bolts (not shown) from one side of hinge (Figure 5, Item 2) and lift hinge (Figure 5, Item 2) out of the way.
7. Remove power distribution panel (Figure 6, Item 1) and lay face down.
8. Ensure that two terminals (Figure 6, Item 6) are properly identified. Remove and retain two bolts (Figure 6, Item 8), lock washers (Figure 6, Item 7), and terminals (Figure 6, Item 6) from J6 (Figure 6, Item 2).

REMOVAL – Continued

9. Remove and retain four bolts (Figure 6, Item 13), flat washers (Figure 6, Item 14), nuts (Figure 6, Item 5), lock washers (Figure 6, Item 4), and flat washers (Figure 6, Item 3) that secure J6 connector (Figure 6, Items 2 and 12) and dust cover (Figure 6, Item 15) to power distribution panel (Figure 6, Item 1).

10. Remove connector (Figure 6, Items 2 and 12) from power distribution panel (Figure 6, Item 1).

END OF TASK

REPLACEMENT

NOTE

If necessary, refer to (Table 6) or (FO-6 through FO-12) for electrical schematics and wiring diagrams.

Refer to (Figure 7) for layout of J6.

1. Inspect wires and terminals (Figure 6, Item 6) for nicks, cuts, burn marks, or other damage. If necessary replace.

2. Inspect connector (Figure 6, Items 2 and 12) for damage or excessive wear and tear, if necessary replace.

3. Install connector (Figure 6, Item 2 and 12) onto power distribution panel (Figure 6, Item 1).

NOTE

When performing the following step, do not tighten hardware until all hardware has been installed.

4. Secure connector (Figure 6, Item 12) and dust cover (Figure 6, Item 15) to power distribution panel (Figure 6, Item 1) using four bolts (Figure 6, Item 13), flat washers (Figure 6, Item 14), nuts (Figure 6, Item 5), lock washers (Figure 6, Item 4) and flat washers (Figure 6, Item 3).

5. Connect terminals (Figure 6, Item 6) to connector (Figure 6, Item 2) using two bolts (Figure 6, Item 8) and lock washers (Figure 6, Item 7).

6. Install one side of hinge (Figure 5, Item 2) and secure using two screws and bolts (not shown).

7. Place power distribution panel (Figure 6, Item 1) onto Genset and secure using 12 bolts (Figure 6, Item 10), and washers (Figure 6, Item 9).

8 Connect all cables to power distribution panel (Figure 6, Item 1).

9. Connect negative terminal to battery (see WP 0041). Flatt Genset in accordance with Genset Flatt Procedure (WP 0005) of this TM.

Table 6. J6 Connections.

CONNECTOR	CONNECTIONS		
	1	2	
J6 24 VOLTS DC	226-BAT1 (+)	225-BAT1 (-)	

NOTE

For clarity the door protecting the circuit breakers has been removed.

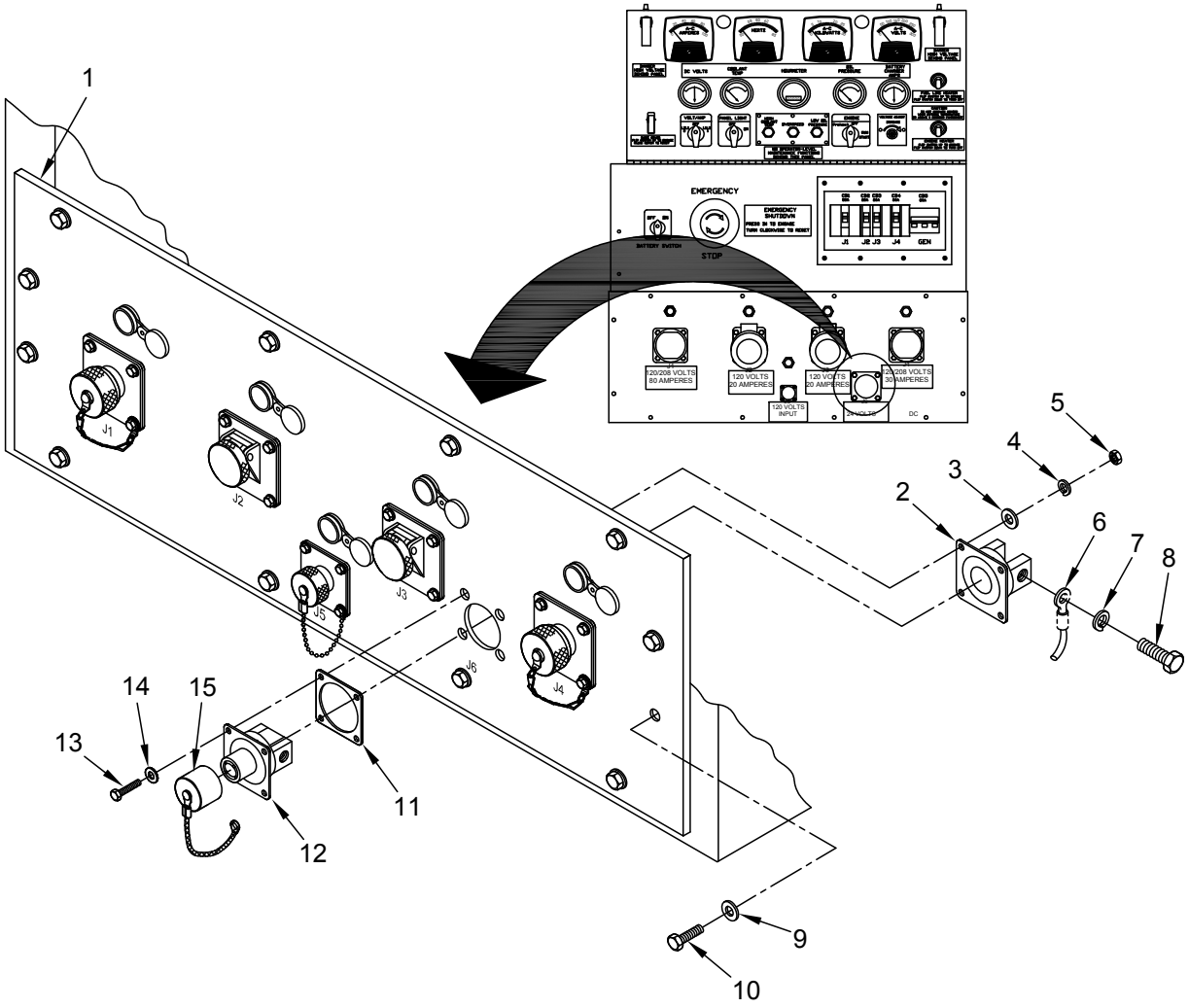


Figure 6. Connector (J6) Removal/Replacement.

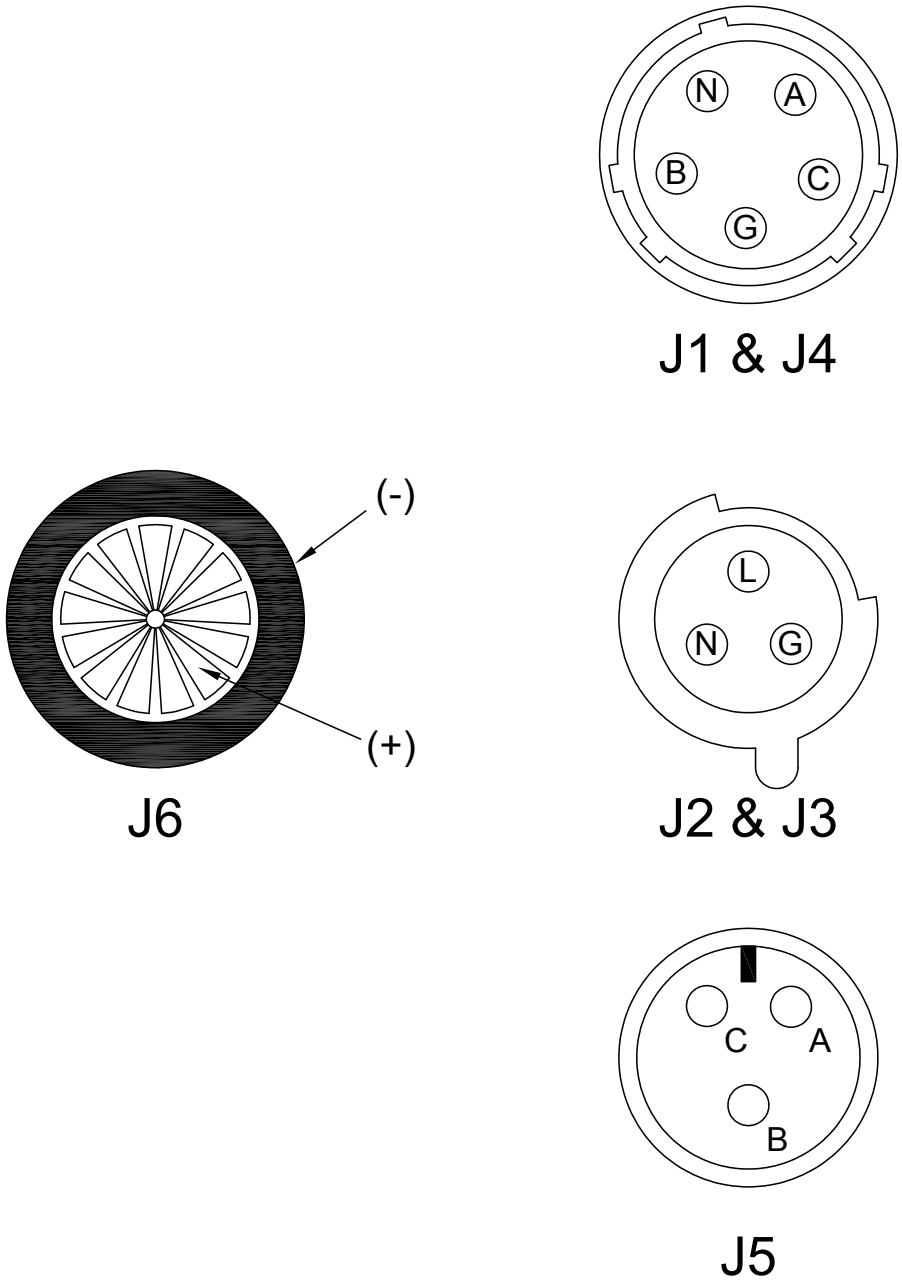


Figure 7. Connector Pin Identification.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET BARRIER PANEL – CURRENT TRANSFORMER

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Current Transformer removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

CURRENT TRANSFORMER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Safety glasses/

Materials/Parts
Current transformer
Strap ties (WP 0168, Item 55 to 57)

Personnel Required
One

Reference
WP 0005, WP 0041, WP 0074,
FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Remove power distribution panel as described in (WP 0074), steps 3 through 6.
4. If necessary, remove plastic cover (Figure 1, Item 10) protecting terminal block (Figure 1, Item 1) associated with current transformer (Figure 1, Item 4) being replaced.
5. Loosen but do not remove terminal screw (Figure 1, Item 2) on terminal block (Figure 1, Item 1) associated with current transformer (Figure 1, Item 4) being replaced. Disconnect wire (Figure 1, Item 3) from terminal block (Figure 1, Item 1) and feed through current transformer (Figure 1, Item 4) being replaced.
6. Remove and retain nut (Figure 1, Item 6) and lock washer (Figure 1, Item 7) securing electrical terminals (Figure 1, Item 8) to current transformer (Figure 1, Item 4) being replaced.
7. Mark and disconnect electrical terminals (Figure 1, Item 8) from current transformer (Figure 1, Item 4) being replaced.
8. Remove strap tie securing current transformer (Figure 1, Item 4) to barrier panel (Figure 1, Item 5) and remove current transformer (Figure 1, Item 4).

END OF TASK

REPLACEMENT

NOTE

If necessary, refer to (FO-6 through FO-12) for electrical schematic.

1. Place current transformer (Figure 1, Item 4) onto barrier panel (Figure 1, Item 5) and secure using strap tie.
2. Feed wire (Figure 1, Item 3) through current transformer (Figure 1, Item 4) and connect to terminal block (Figure 1, Item 1) and tighten terminal screw (Figure 1, Item 2). If applicable, secure plastic cover (Figure 1, Item 10) protecting terminal block (Figure 1, Item 1).
3. Connect electrical terminals (Figure 1, Item 8) to current transformer (Figure 1, Item 4) and secure using nut (Figure 1, Item 6) and lock washer (Figure 1, Item 7).
4. Replace power distribution panel as described in (WP 0074, step 5).
5. Connect all cables to power distribution panel (Figure 1, Item 1).
6. Connect negative terminal to battery (see WP 0041). Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Genset Barrier Panel – Current Transformer Connections.

CURRENT TRANSFORMER	TERMINAL CONNECTIONS		FEED THROUGH CONNECTION
	X1-	X2	
CT1	57-TB2-1-2	91-TB2-4-2	111-CB5-1 (black)
CT2	58-TB2-2-3	92-TB2-5-2	112-CB5-3 (red)
CT3	59-TB2-3-2	93-TB2-6-2	113-CB5-5 (blue)

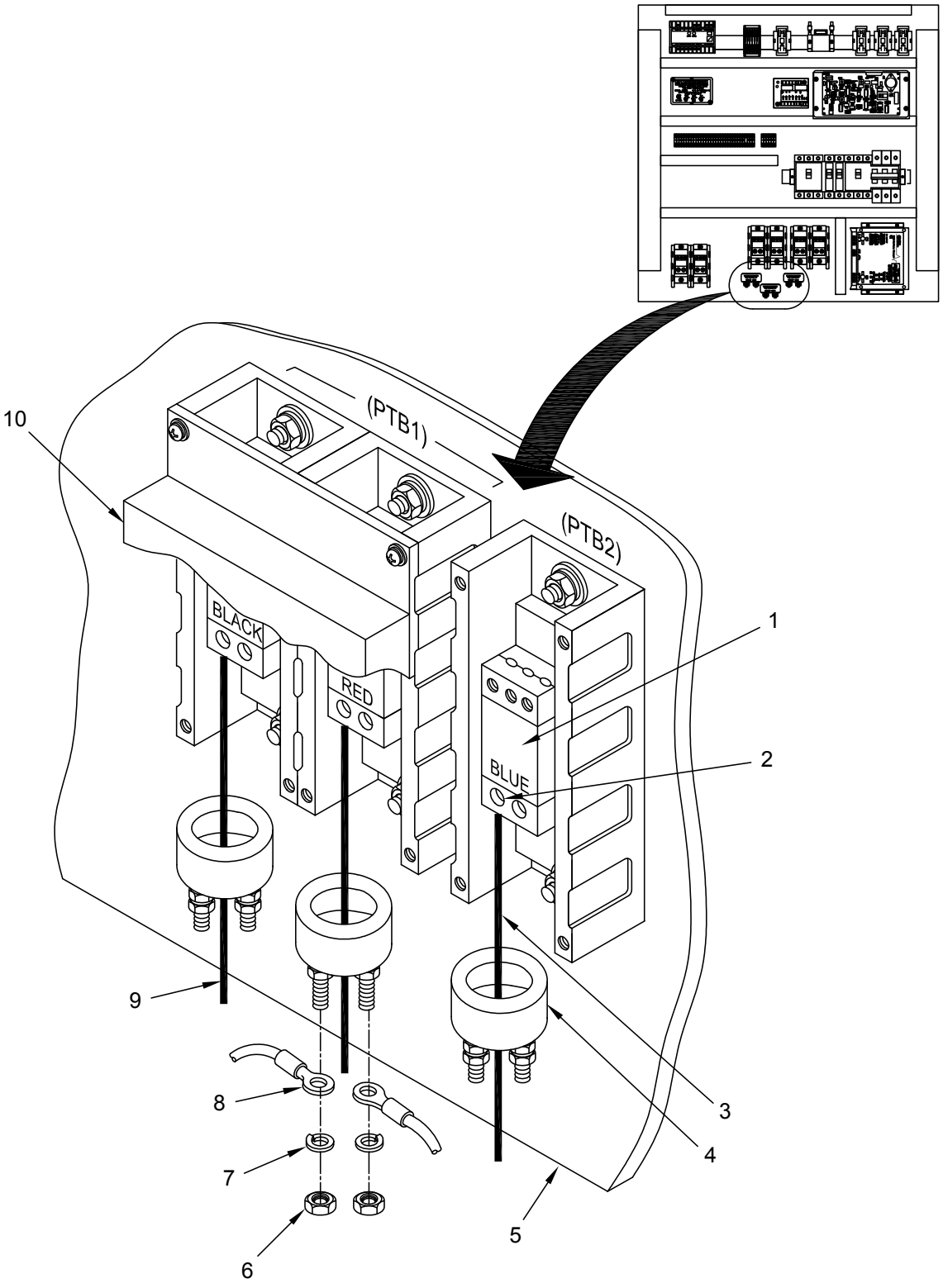


Figure 1. Current Transformer Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET BARRIER PANEL – TRANSDUCER

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Watt Transducer removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

TRANSDUCER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)

Materials/Parts
Transducer
Strap ties (WP 0168, Item 55 to 57)

Personnel Required
One

Reference
WP 0005, WP 0041
FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Loosen but do not remove terminal screws (Figure 1, Item 5) on transducer (Figure 1, Item 1).
5. Mark and disconnect electrical terminals (Figure 1, Item 4) from transducer (Figure 1, Item 1).
6. Remove strap ties securing transducer (Figure 1, Item 1) to mounting strip (Figure 1, Item 2).
7. Release locking tab (Figure 1, Item 3) and remove transducer (Figure 1, Item 1) from mounting strip (Figure 1, Item 2).

END OF TASK

REPLACEMENT

NOTE

If necessary, refer to (FO-6 through FO-12) for electrical schematic.

Due to excessive weight, transducer may separate from mount if strap ties are not used.

1. Install transducer (Figure 1, Item 1) onto mounting strip (Figure 1, Item 2) and secure locking tab (Figure 1, Item 3).
2. Connect electrical terminals (Figure 1, Item 4) to transducer (Figure 1, Item 1) and tighten terminal screws (Figure 1, Item 5).
3. Secure transducer (Figure 1, Item 1) to mounting strip (Figure 1, Item 2) using strap ties.
4. Close and latch control panel.
5. Connect all cables to power distribution panel (Figure 1, Item 1).
6. Connect negative terminal to battery (see WP 0041). Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

NOTE

Terminals #10 and 12 are not present on transducer.

Table 1. Genset Barrier Panel – Transducer Connections.

TRANSDUCER TERMINAL	TERMINAL CONNECTIONS		TRANSDUCER TERMINAL	TERMINAL CONNECTIONS
1	239-TB2-1-1		9	69-CM2-16
2	94-F1-3			
3	67-CM2-14		11	87-PTB2-10
4	240-TB2-2-1			
5	no connection		13	no connection
6	68-CM2-15		14	no connection
7	241-TB2-3-1		15	82-CM2-23
8	95-F3-3		16	81-CM2-22

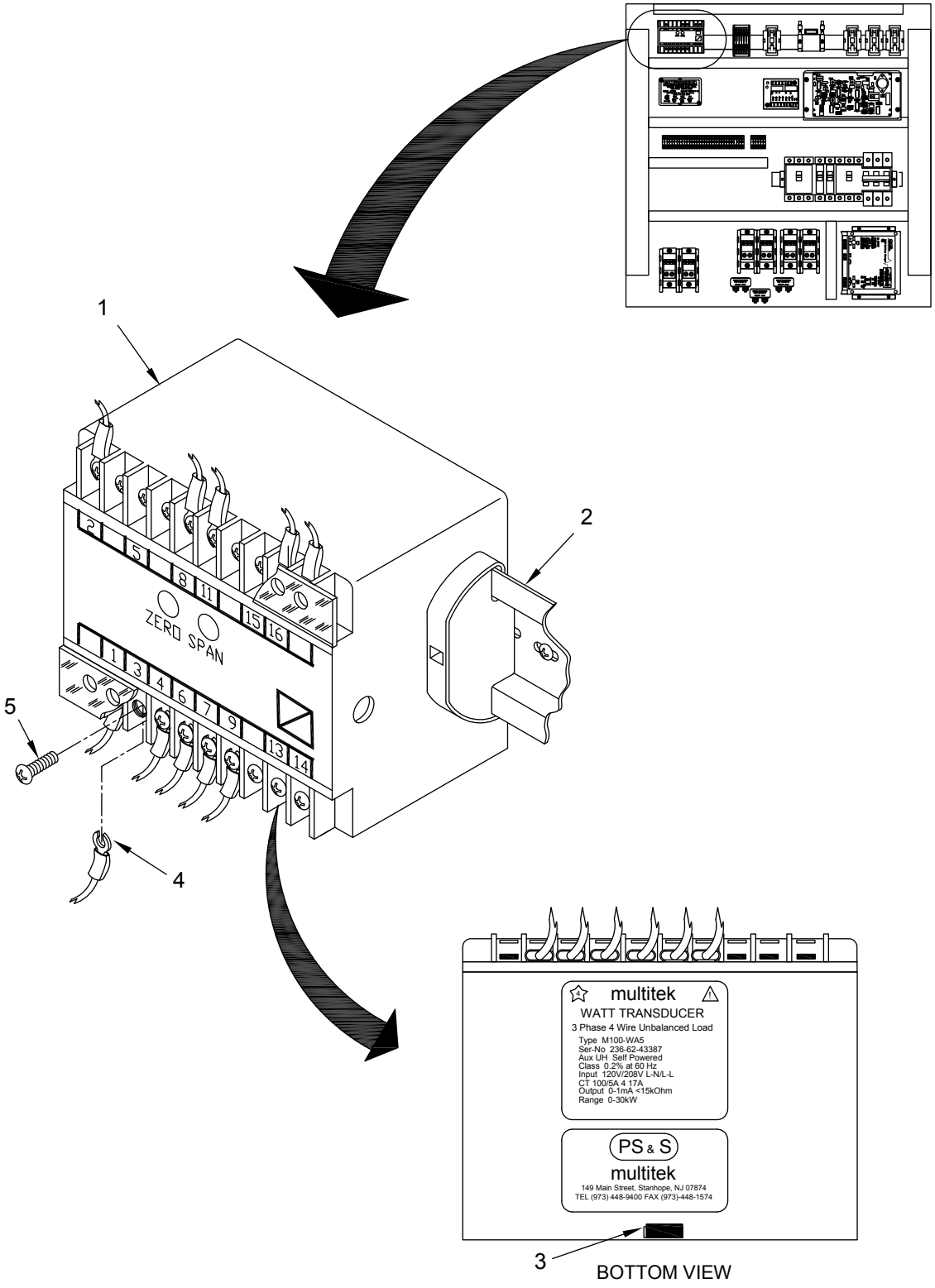


Figure 1. Transducer Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET BARRIER PANEL – RELAYS

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Over temperature relay (K4) removal/replacement
- Engine over speed relay (K5) removal/replacement
- Oil pressure low relay (K6) removal/replacement
- Governor controller relay (K7) removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

Relays K4, K5 and K6 operate of off 24 VDC and are interchangeable. Relay K7 operates off of 115 VAC.

RELAY (K4, K5, K6, K7) REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Current transformer
Strap ties (WP 0168, Item 55 to 57)

Personnel Required
One

Reference
WP 0005, WP 0041

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Remove relay (Figure 1, Item 3) from socket (Figure 1, Item 2) on barrier panel (Figure 1, Item 1) and set aside.

END OF TASK

REPLACEMENT

1. Properly orientate relay (Figure 1, Item 3) (DC LED at bottom) and insert into socket (Figure 1, Item 2).
2. Close control panel and latch.
3. Connect all cables to power distribution panel (Figure 1, Item 1).
4. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

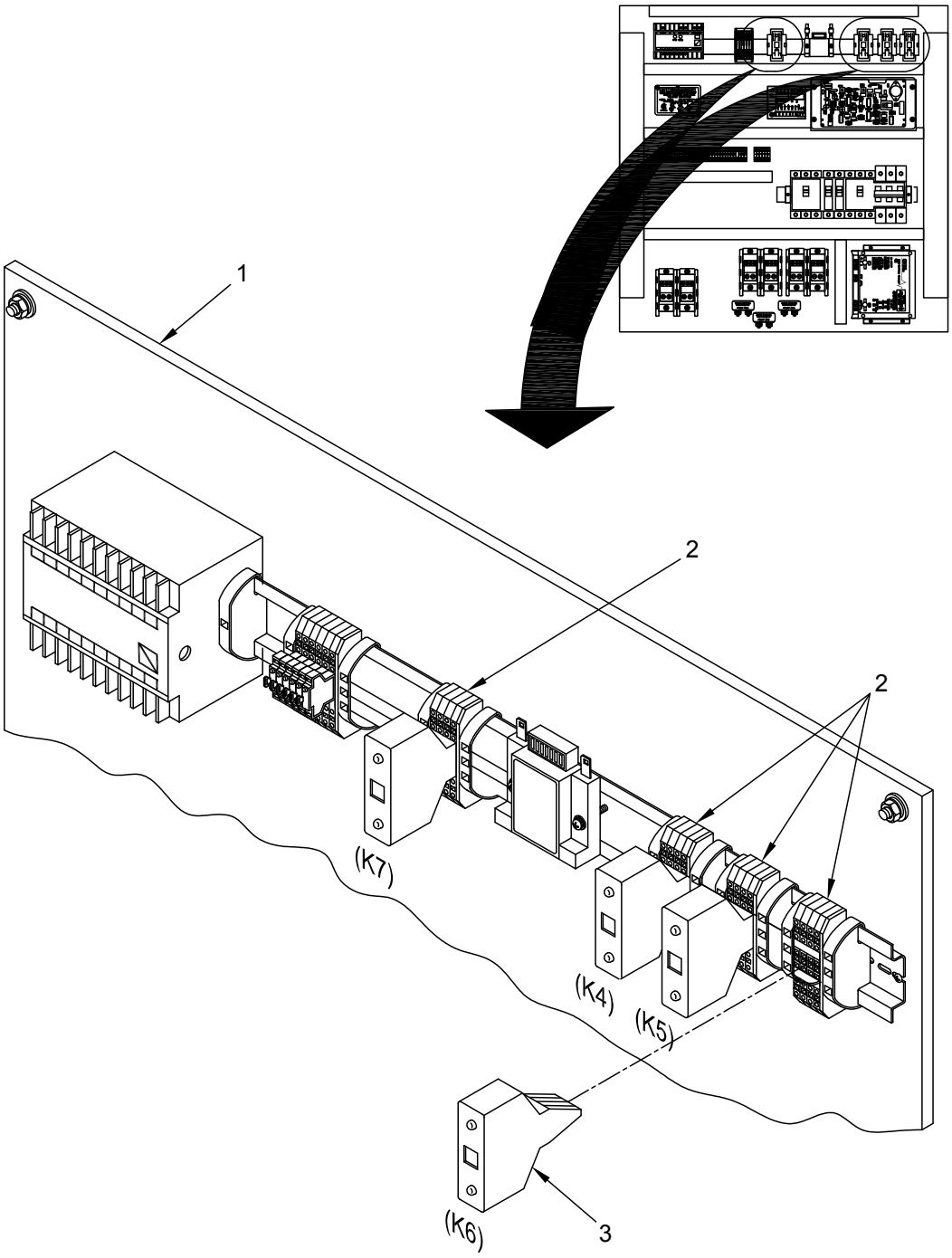


Figure 1. Relay Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET BARRIER PANEL –TIME DELAY

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Time delay removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

The time delay should be set for a four second delay.

TIME DELAY REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Current transformer
Strap ties (WP 0168, Item 55 to 57)

Personnel Required
One

Reference
WP 0005, WP 0041

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Mark and disconnect two terminals (Figure 1, Item 8) from time delay (Figure 1, Item 3).
5. Remove and retain two screws (Figure 1, Item 4), lock washers (Figure 1, Item 5) and flat washers (Figure 1, Item 6) that secure time delay (Figure 1, Item 3) to barrier panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

1. Place time delay (Figure 1, Item 3) onto rail (Figure 1, Item 2) of barrier panel (Figure 1, Item 1).
2. Secure using two screws (Figure 1, Item 4), lock washers (Figure 1, Item 5) and flat washers (Figure 1, Item 6).
3. Verify that DIP switches (Figure 1, Item 7) are set for a four second delay (see Figure 1).
4. Connect two terminals (Figure 1, Item 8) to time delay (Figure 1, Item 3).
5. Close and latch control panel.

REPLACEMENT – Continued

6. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

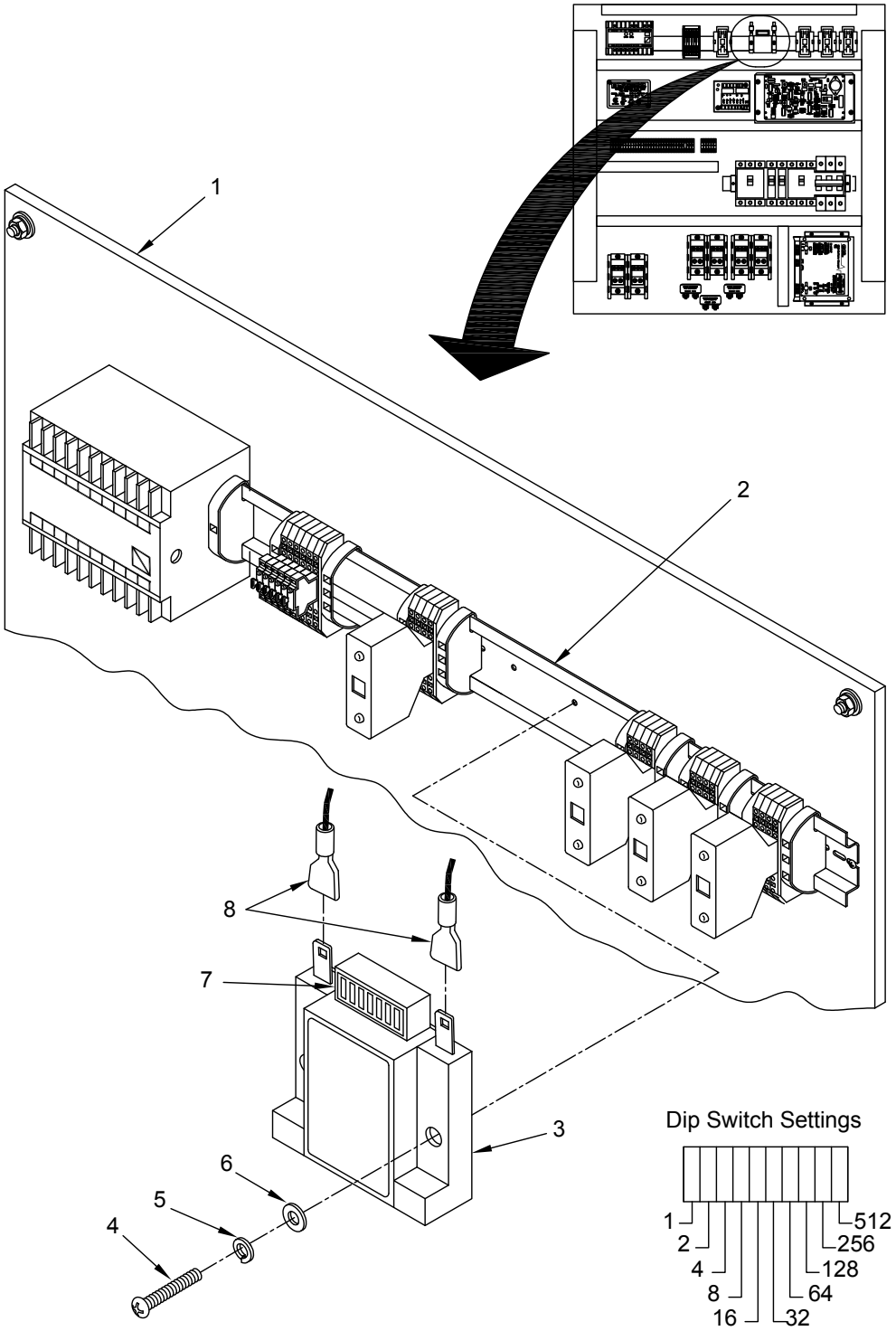


Figure 1. Time Delay Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET BARRIER PANEL – VOLTAGE REGULATOR

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Voltage regulator removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12)for electrical schematics and wiring diagrams.

VOLTAGE REGULATOR REMOVAL/REPLACEMENT/ADJUSTMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Voltage Regulator

Personnel Required
One

Reference
WP 0005, WP 0041
FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Remove and retain two screws (Figure 1, Item 3), lock washers (Figure 1, Item 4) and flat washers (Figure 1, Item 5) securing voltage regulator (Figure 1, Item 2) to stand-offs (Figure 1, Item 7).
5. Remove voltage regulator (Figure 1, Item 2) from stand-offs (Figure 1, Item 7).

NOTE

If voltage regulator has no output, inspect fuse on backside of voltage regulator. If fuse is bad, replace and check for operational status before replacing.

6. Mark and disconnect terminals (Figure 1, Item 6) from voltage regulator (Figure 1, Item 2) and set voltage regulator (Figure 1, Item 2) aside.

END OF TASK

REPLACEMENT

NOTE

If necessary, refer to (FO-6 through FO-12) or (Table 1) for electrical schematics and wiring diagrams.

1. Connect terminals (Figure 1, Item 6) to voltage regulator (Figure 1, Item 2) (see Table 1).
2. Place voltage regulator (Figure 1, Item 2) onto stand-offs (Figure 1, Item 7) and secure using two screws (Figure 1, Item 3), lock washers (Figure 1, Item 4) and flat washers (Figure 1, Item 5).
3. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
4. If necessary adjust voltage regulator as described below.

5; Close and latch control panel.

6. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Voltage Regulator Connections.

Voltage Regulator Connections	CONNECTION
60 Hz	no connection
50 Hz	no connection
4	74-F7-3
6	86-CM2-25
7	85-CM2-24
F-	238-TB1-49-1
F+	237-TB1-48-1
3	70-F1-2

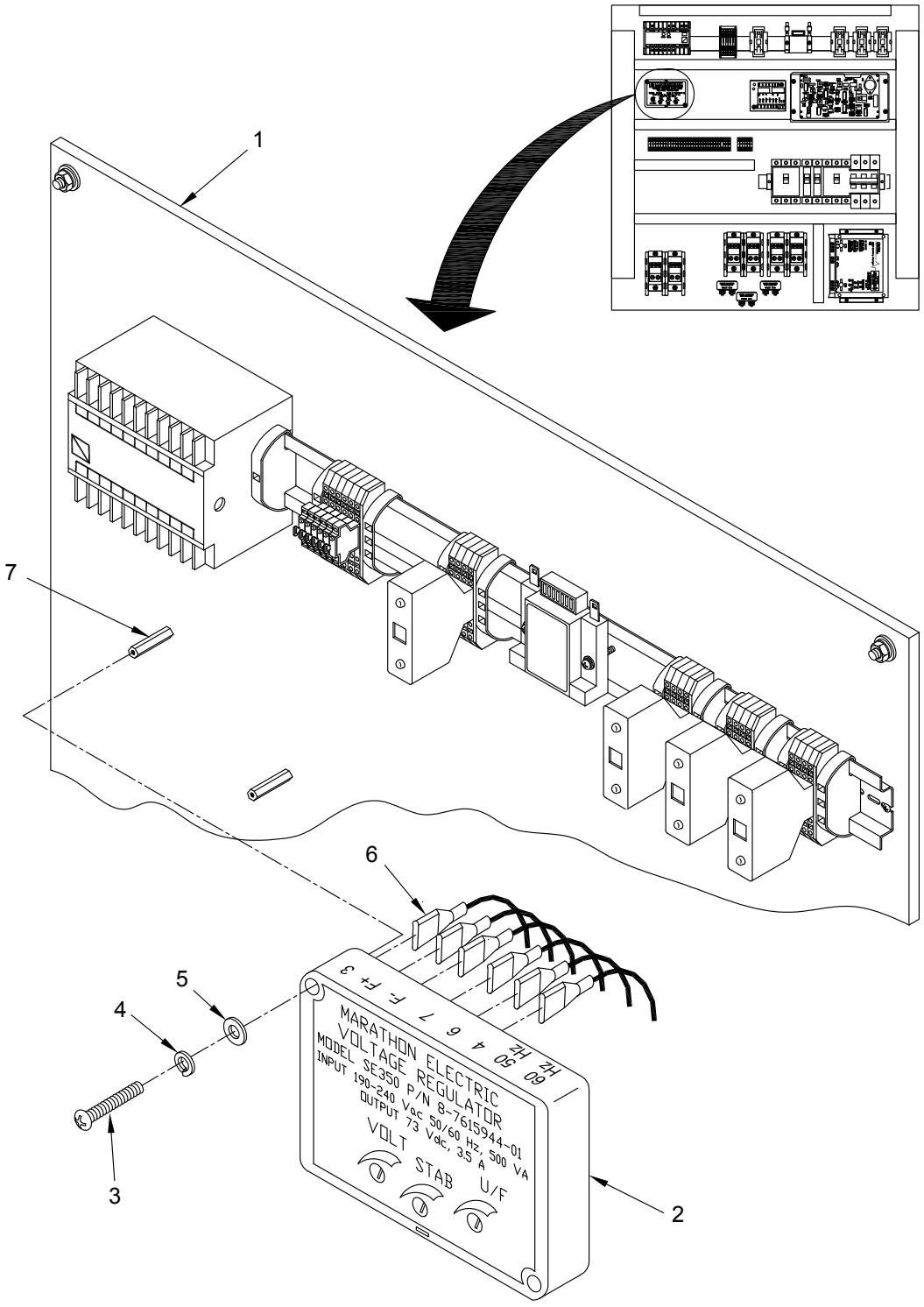


Figure 1. Voltage Regulator Removal/Replacement.

END OF TASK

ADJUSTMENT

Voltage Output

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

2. Set VOLT/AMP switch to any leg.

3. Check voltage on A-C VOLTS meter.

4. Adjust voltage output using VOLTAGE ADJUST potentiometer on control panel. If voltage can not be adjusted far enough, perform the following adjustment procedure:

   a) On control panel:
      1. Center VOLTAGE ADJUST potentiometer on control panel.

      2. Adjust VOLTAGE ADJUST potentiometer on control panel fully clockwise and note position on A-C VOLTS meter.

      3. Adjust VOLTAGE ADJUST potentiometer on control panel fully counter-clockwise and count note position on A-C VOLTS meter.

      4. Adjust VOLTAGE ADJUST potentiometer on control panel clockwise until centered between two noted positions on A-C VOLTS meter.

      5. Check and calibrate A-C VOLTS meter.

   b) On barrier panel:
      1. Identify voltage regulator on center line of barrier panel on the left.

      2. Identify VOLT adjust set screw on left of voltage-regulator (see Figure 2).

      3. Adjust VOLT set screw while monitoring voltage on multi-meter.

      4. Adjust voltage to exactly 208 volts.

5. Check voltage on A-C VOLTS meter.

END OF TASK

Voltage Stability

NOTE

System stability is the ability of the generator to respond to load transients. Decreasing the stability makes the generator less sluggish and faster to respond to load transients. If the stability of the regulator is decreased too much, the generator will tend to hunt under steady state condition.

To increase stability, adjust STAB potentiometer (see Figure 2) clockwise. This will increase the response time of the generator.

To decrease stability, adjust STAB potentiometer counter-clockwise. This will decrease the response time of the generator.

END OF TASK

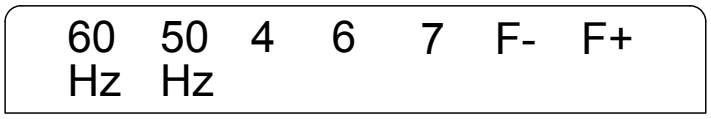
V/HZ ROLL-OFF FREQUENCY SELECTION

NOTE

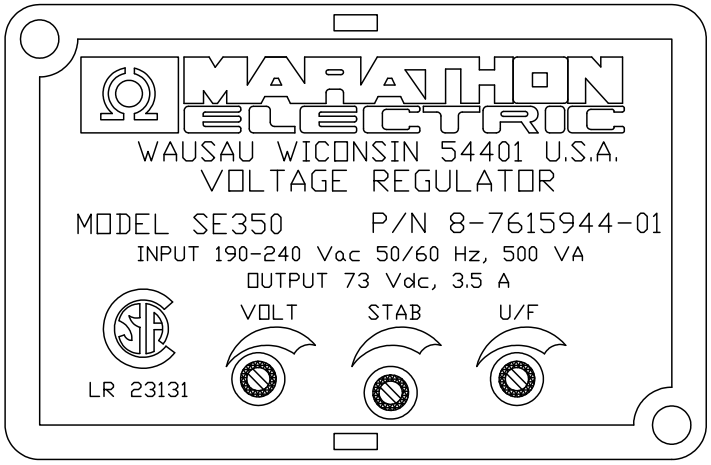
The roll off point is the frequency where the generator voltage starts to decrease. This reduces the Kilowatt load to the engine, which allows the engine to recover in speed under any load transient condition. In 60Hz mode the roll-off frequency has a range of 54-61 Hz.

This voltage regulator has the roll-off point preset to 58Hz in the 60Hz mode.

1. Adjust engine speed to the desired rated speed.
2. Set the voltage to the desired setting at rated speed.
3. Adjust engine speed to the desired roll-off point.
4. Adjust the U/F potentiometer (see Figure 2) counter-clockwise until the voltage starts to drop off.
5. Adjust the U/F potentiometer (see Figure 2) clockwise until the voltage returns to rated voltage.
6. Re-adjust engine speed to rated speed.



TERMINAL IDENTIFIERS
(VIEW ROTATED 180° FOR CLARIETY)



POTENTIOMETERS

VOLT - Voltage
STAB - Stability
U/F - Under Frequency

Figure 2. Voltage Regulator Connections and Potentiometer Identification.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET BARRIER PANEL – SPEED SENSOR

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Speed sensor removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

SPEED SENSOR REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Speed Sensor

Personnel Required
One

Reference
WP 0005, WP 0041
FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.

NOTE

It is not necessary to disconnect jumper wire running from terminal #12 to terminal # 1 of speed sensor.

4. Mark and disconnect terminals (Figure 1, Item 3) from speed sensor (Figure 1, Item 2).
5. Remove one screw (Figure 1, Item 4) and flat washer (Figure 1, Item 5) securing speed sensor (Figure 1, Item 2) to barrier panel (Figure 1, Item 1).
6. Remove two ground terminals (Figure 1, Item 6), second screw (Figure 1, Item 4) and flat washer (Figure 1, Item 5) securing speed sensor (Figure 1, Item 2) to barrier panel (Figure 1, Item 1).
7. Remove speed sensor (Figure 1, Item 2) from barrier panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

NOTE

If necessary, refer to (FO-6 through FO-12) or (Table 1) for electrical schematics and wiring diagrams.

1. Place speed sensor (Figure 1, Item 2) onto barrier panel (Figure 1, Item 1) and secure using one screw (Figure 1, Item 4) and flat washer (Figure 1, Item 5).

2. Secure two ground terminals (Figure 1, Item 6) to speed sensor (Figure 1, Item 2) and secure using second screw (Figure 1, Item 4) and flat washer (Figure 1, Item 5).

2. Connect remaining terminals (Figure 1, Item 3) to speed sensor (Figure 1, Item 2).

3; Close and latch control panel.

4. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Speed Sensor Connections.

SPEED SENSOR TERMINALS	CONNECTION
1	213-SS-12
2	214-SS-G
	242-TB1-2-1
3	18-TB1-18b-1
4	19-TB1-19-1
5	no connection
6	no connection
7	no connection
8	no connection
9	no connection
10	no connection
11	32-K5-6
12	28-K6-8
	213-SS-1
13	no connection
ground	SH-TB1-20-1
	214-SS-2

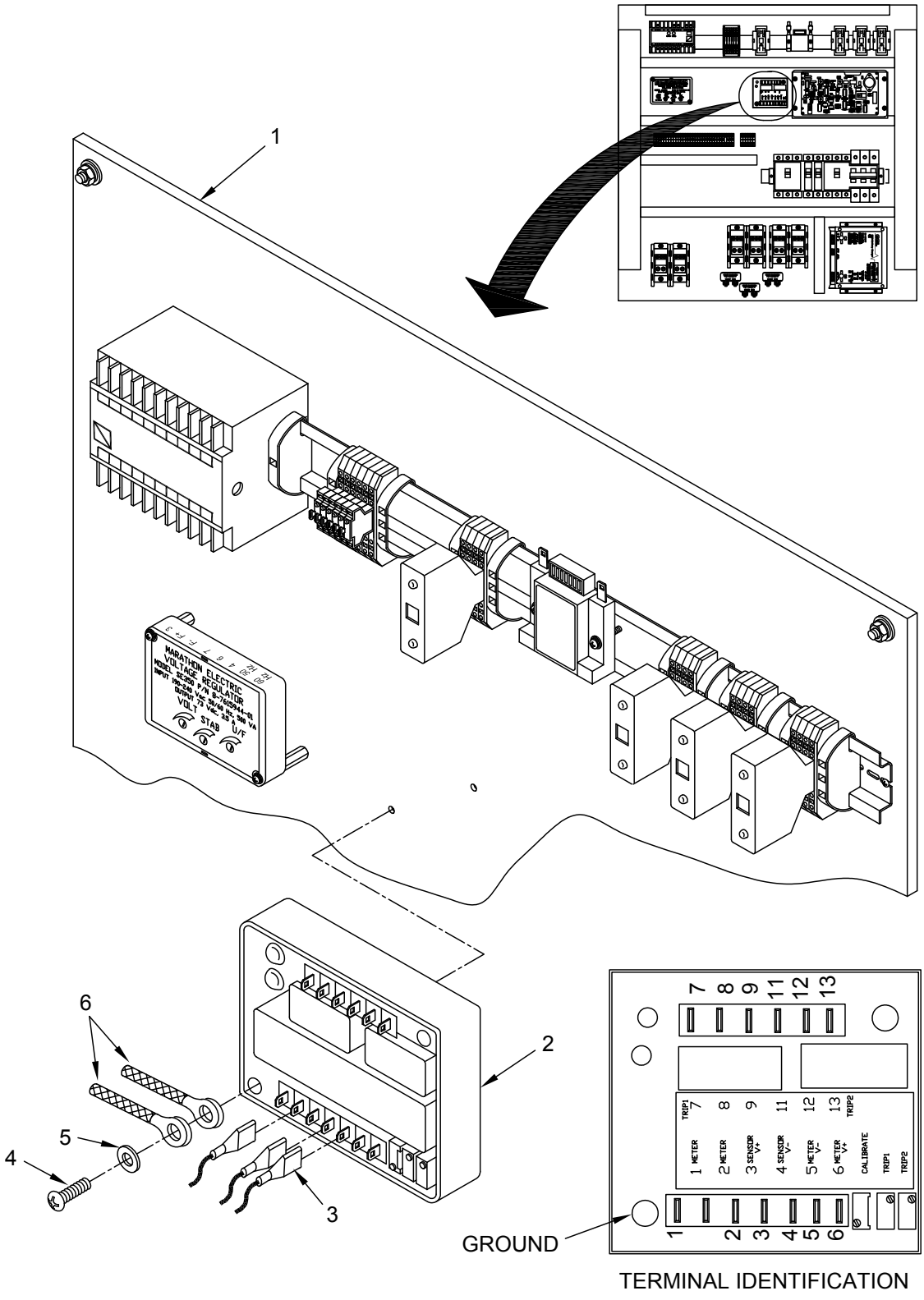


Figure 1. Speed Sensor Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET BARRIER PANEL – PRECISION GOVERNOR

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Precision Governor removal/replacement/adjustments

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

PRECISION GOVERNOR REMOVAL/REPLACEMENT/ADJUSTMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Precision governor

Personnel Required
One

Reference
WP 0005, WP 0041,
WP 0068, FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Remove and retain four screws (Figure 1, Item 6), lock washers (Figure 1, Item 5), and flat washers (Figure 1, Item 4) securing precision governor (Figure 1, Item 3) to stand-offs (Figure 1, Item 2) on barrier panel (Figure 1, Item 1).
5. Mark and disconnect terminals (Figure 1, Item 7) from precision governor (Figure 1, Item 3).
6. Remove precision governor (Figure 1, Item 3) from barrier panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

NOTE

If necessary, refer to (FO-6 through FO-12) or (Table 1) for electrical schematics and wiring diagrams. See (Figure 1) for terminal identification.

1. Connect terminals (Figure 1, Item 7) to precision governor (Figure 1, Item 3).

2. Install precision governor (Figure 1, Item 3) and secure to stand-offs (Figure 1, Item 2) on barrier panel (Figure 1, Item 1) using four screws (Figure 1, Item 6), lock washers (Figure 1, Item 5), and flat washers (Figure 1, Item 4).

3. Close and latch control panel.

4. Connect negative terminal to battery (see WP 0041). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Precision Governor Connections.

PRECISION GOVERNOR TERMINALS	CONNECTION
1 + PWR	236-TB1-21-1
2 GND	22-TB1-22-1
3 SIG +	233-TB1-18-1
4 SIG –	234-TB1-19b-1
5 ACT	16-TB1-16-1
6 ACT	17-TB1-17-1
7 AUX 1	no connection
8 AUX 2	no connection

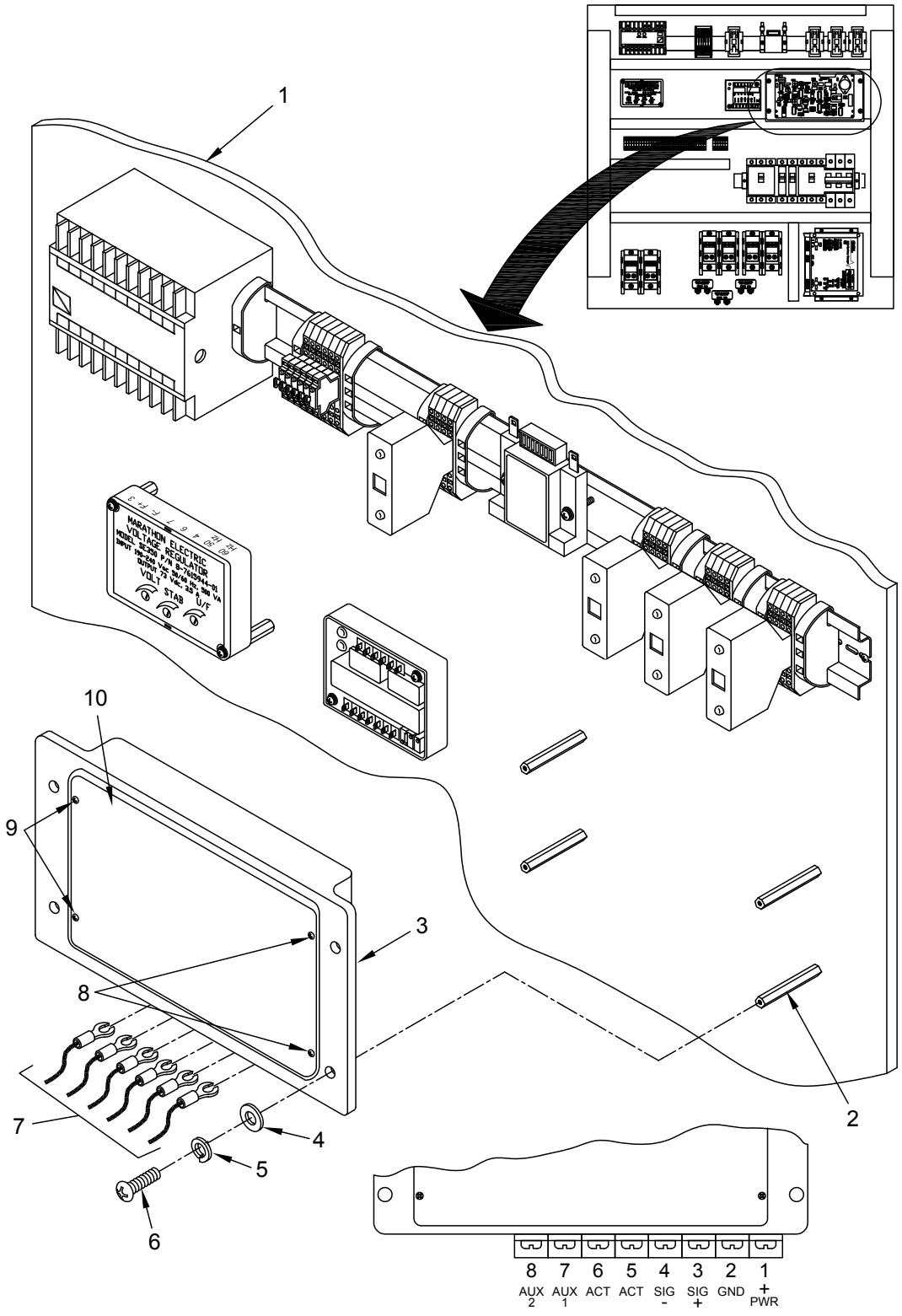


Figure 1. Precision Governor Removal/Replacement.

END OF TASK

ADJUSTMENTS

The following adjustments can cause the main speeds to change; once any changes are made to the derivative, integral and/or gain verify that the main speed is set at its desired setting.

Speed (Frequency) Adjustment (P4) – Controls frequency of the Genset output.

Derivative Adjustment (P6) – Controls how the governor reacts immediately after a load change. Increasing the derivative gain will significantly reduce the engine speed "spike" after a load change

Integral Adjustment (P3) – Controls how quickly the engine completely recovers from large load changes, that is the time period after 1 second from a load change.

Gain Adjustment (P2) – Adjusts the overall response of the governor. When adjusting Gain on a warm engine, it is recommended to adjust the gain so the engine is stable then reduce it slightly. This allows the governor to properly control an engine when it is cold and responds slower.

NOTE

The P1 and P5 pots are not used in this configuration and are not present on the board, the location is shown for reference only.

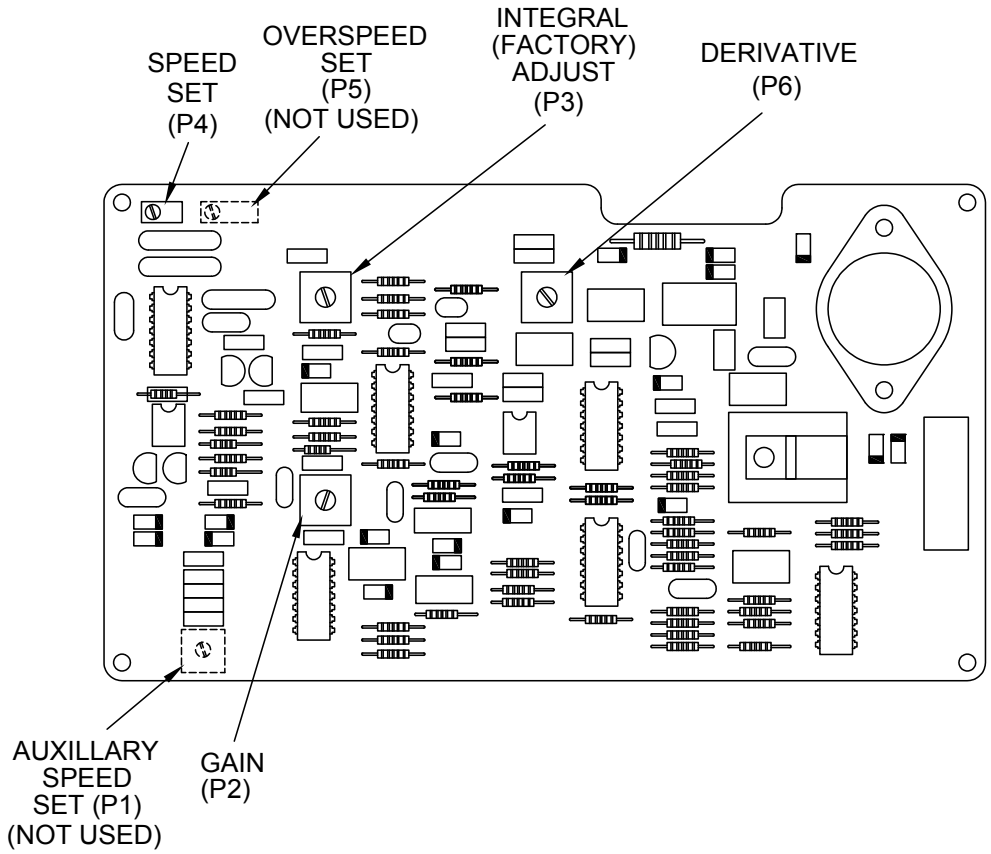


Figure 2. Potentiometer Location and Identification.

SPEED (FREQUENCY) (P4) ADJUST

NOTE

By adjusting the speed potentiometer clockwise (CW) speed increases.

By adjusting the speed potentiometer counter clockwise (CCW) speed decreases.

The adjustment range of the pot is 25 full turns.

One full turn will change speed about 100 - 200 rpm.

This potentiometer is protected by a slip clutch at each end and will not be harmed by moderate over-adjustment. However, the governor will not function while the pot is past full travel.

If you suspect you may have over-adjusted the Speed Set pot or have lost track of where you are, turn the pot 25-30 turns CCW, then back 10-12 turns CW to get back into the range of normal adjustment.

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
2. Check frequency reading on HERTZ meter.
3. Open control panel and allow control panel to drop down and hang from lanyards.
4. Check and calibrate the HERTZ meter (see WP 0068).
5. Remove and retain two screws (Figure 1, Item 8) on right side of access cover (Figure 1, Item 10).
6. Loosen but do not remove two screws (Figure 1, Item 9) on left side of access cover (Figure 1, Item 10).
7. Remove access cover (Figure 1, Item 10) and locate speed set potentiometer (P4) (upper left corner of circuit card (see Figure 2).
8. Adjust the frequency to 60 hertz by adjusting speed set potentiometer (P4) screw while monitoring the frequency on the HERTZ meter.
9. Replace access cover (Figure 1, Item 10), install two screws (Figure 1, Item 8).
10. Tighten four screws (Figure 1, Items 8 and 9).
11. Close and latch control panel.
12. Check HERTZ meter and verify proper operational frequency.

END OF TASK

DERIVATIVE (P6) ADJUST

CAUTION

The derivative potentiometer (P6) is a single –turn potentiometer. Be gentle, this pot turns 270°, and over-turning will break the internal stops, making adjustment impossible.

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

3. Open control panel and allow control panel to drop down and hang from lanyards.

5. Remove and retain two screws (Figure 1, Item 8) on right side of access cover (Figure 1, Item 10).

6. Loosen but do not remove two screws (Figure 1, Item 9) on left side of access cover (Figure 1, Item 10).

7. Remove access cover (Figure 1, Item 10) and locate derivative potentiometer (P6) (upper middle of circuit card. See Figure 2).

NOTE

Turning the derivative potentiometer (P6) CW increases governor sensitivity. Too much derivative will cause a very quick engine surge, possibly up to several strokes a second.

Turning derivative potentiometer (P6) CCW decreases governor sensitivity. Too low of a derivative setting will show up as sluggish response.

8. Adjust derivative potentiometer (P6) screw to desired setting.

9. Replace access cover (Figure 1, Item 10), install two screws (Figure 1, Item 8).

10. Tighten four screws (Figure 1, Items 8 and 9).

11. Close and latch control panel.

END OF TASK

INTERGRAL (P3) ADJUST

The integral adjust potentiometer (P3) is set at the factory and should not be adjusted unless absolutely necessary.

CAUTION

The integral adjust potentiometer (P3) is a single –turn potentiometer. Be gentle, this pot turns 270°, and over-turning will break the internal stops, making adjustment impossible.

NOTE

Increasing the integral gain shortens the time to achieve the desired engine speed.

Too low of an integral adjustment causes the engine to slowly achieve the desired speed.

Excessive integral gain will cause the engine to “over respond” for a second or two before settling at the desired speed. It can also result in a slow wander of the engine speed.

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
3. Open control panel and allow control panel to drop down and hang from lanyards.
5. Remove and retain two screws (Figure 1, Item 8) on right side of access cover (Figure 1, Item 10).
6. Loosen but do not remove two screws (Figure 1, Item 9) on left side of access cover (Figure 1, Item 10).
7. Remove access cover (Figure 1, Item 10) and locate integral adjust potentiometer (P3) upper left corner of circuit card (See Figure 2).

NOTE

Turning the integral adjusts potentiometer (P3) CW increases gain.

Turning integral adjust potentiometer (P3) CCW decreases gain.

8. Adjust integral adjust potentiometer (P3) to desired setting.
9. Replace access cover (Figure 1, Item 10); install two screws (Figure 1, Item 8).
10. Tighten four screws (Figure 1, Items 8and 9).
11. Close and latch control panel.

END OF TASK

GAIN (P2) ADJUST

CAUTION

The gain adjust potentiometer (P2) is a single –turn potentiometer. Be gentle, this pot turns 270°, and over-turning will break the internal stops, making adjustment impossible.

NOTE

Increasing the gain adjustment will cause the governor to respond quicker.

Setting the gain too high typically causes an engine speed surge that occurs on every ½ to 1 second.

Decreasing this adjustment will cause the governor to respond slower.

Setting the gain too low causes sluggish engine performance.

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
3. Open control panel and allow control panel to drop down and hang from lanyards.
5. Remove and retain two screws (Figure 1, Item 8) on right side of access cover (Figure 1, Item 10).
6. Loosen but do not remove two screws (Figure 1, Item 9) on left side of access cover (Figure 1, Item 10).
7. Remove access cover (Figure 1, Item 10) and locate the gain potentiometer (P2) (lower left of circuit card (see Figure 2).

NOTE

Turning the gain potentiometer (P2) CW gain increases.

Turning the gain potentiometer (P2) CCW gain decreases.

8. Adjust the gain potentiometer (P2) to desired setting.
9. Replace access cover (Figure 1, Item 10), install two screws (Figure 1, Item 8).
10. Tighten four screws (Figure 1, Items 8and 9).
11. Close and latch control panel.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET BARRIER PANEL – CIRCUIT BREAKER

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. Consisting of:

- Circuit Breaker (CB1) 50 AMP: ECU POWER SUPPLY removal/replacement
- Circuit Breaker (CB2) 20 AMP ON BOARD POWER LEAD removal/replacement
- Circuit Breaker (CB3) 20 AMP: ON BOARD POWER LEAD removal/replacement
- Circuit Breaker (CB4) 30 AMP: PDU POWER SUPPLY removal/replacement
- Circuit Breaker (CB5) 80 AMP: MAIN POWER BREAKER removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

CIRCUIT BREAKER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)

Materials/Parts
Circuit Breaker

Personnel Required
One

Reference
WP 0005, WP 0041,
WP 0074, FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedures apply to all circuit breakers.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and remove bottom half of control panel (see WP 0074).
4. Mark electrical connections (Figure 1, Item 5) on circuit breaker (Figure 1, Item 3) being replaced.
5. Loosen terminal screws (Figure 1, Item 6) securing electrical connections (Figure 1, Item 5).
6. Remove electrical connections (Figure 1, Item 5) from circuit breaker (Figure 1, Item 3).

NOTE

For CB1 through CB4, tab (Figure 1, Item 2) is located at top. For CB5, two tabs (not shown) are located at bottom of circuit breaker.

7. Lift up on tab (Figure 1, Item 2) of circuit breaker (Figure 1, Item 3) being replaced.
8. Remove circuit breaker (Figure 1, Item 3) from mounting bracket (Figure 1, Item 4) on barrier panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT

NOTE

For CB1 through CB4, tab (Figure 1, Item 2) is located at top. For CB5, two tabs (not shown) are located at bottom of circuit breaker.

1. Install circuit breaker (Figure 1, Item 3) onto mounting bracket (Figure 1, Item 4) of barrier panel (Figure 1, Item 1) and secure with tab (Figure 1, Item 2).

NOTE

If necessary, refer to (Table 1) or (FO-6 through FO-12) for electrical schematic.

2. Loosen terminal screws (Figure 1, Item 6) of circuit breaker (Figure 1, Item 3) and install electrical connections (Figure 1, Item 5). Torque terminal screws (Figure 1, Item 6) of circuit breaker (Figure 1, Item 3) to 45 in-lbs.

3. Install bottom half of control panel (see WP 0074).

4. Connect negative terminal to battery (see WP 0041).

5. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Battery Charger Connections.

CIRCUIT BREAKER	TERMINAL	HARNESS CONNECTION	TERMINAL	HARNESS CONNECTION
CB1	1	131-PTB1-2	2	106-CM3-3
	3	132-PTB1-8		228-J1-A-#6 THNN BK
	5	133-PTB2-2	4	229-J1-B-#6 THNN RD
			6	230-J1-C-#6 THNN BL
CB2	1	141-PTB1-1	2	116-CM3-5
				145-CM4-10
CB3	1	142-PTB1-7	2	126-CM3-7
				146-CM4-11
CB4	1	151-PTB1-4	2	128-CM3-8
				252-J4-A-#6 THNN BK
	3	152-PTB1-10	4	253-J4-B-#6 THNN RD
	5	153-PTB2-4	6	254-J4-C-#6 THNN BL
CB5	1	111-PTB1-L1	2	51-F1-1
				248-GEN-BLK
	3	112-PTB1-L2	4	52-F2-1
				249-GEN-RED
	5	113-PTB2-L3	6	53-F3-1
				250-GEN-BLUE

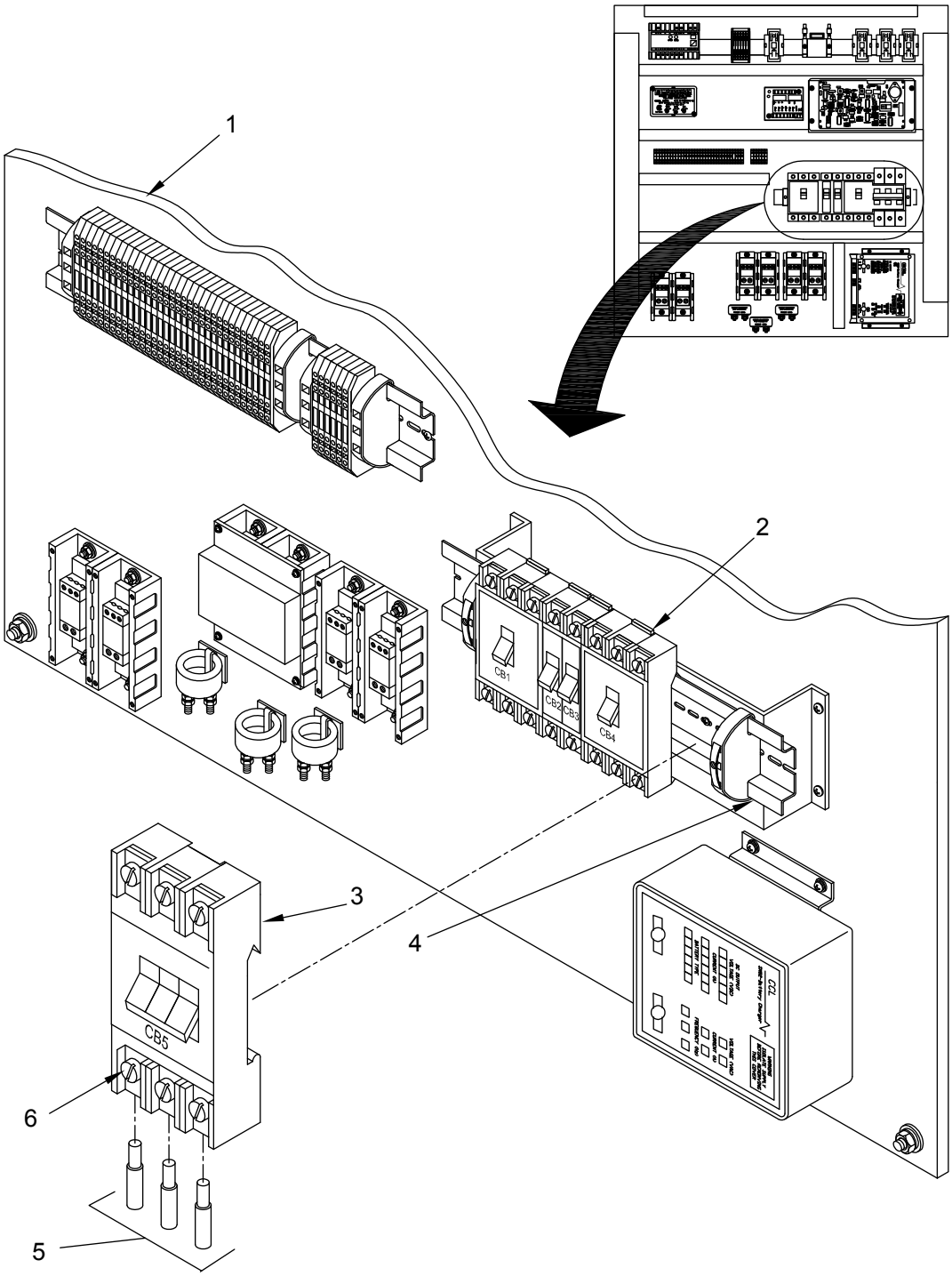


Figure 1. Circuit Breaker Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET BARRIER PANEL – BATTERY CHARGER

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. Consisting of:

- Battery charger removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

BATTERY CHARGER TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)

Materials/Parts
Battery Charger

Personnel Required
One

Reference
WP 0005, WP 0041, WP 0074,
FO-6 through FO-12

Equipment Condition
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

TEST

1. Using multimeter, measure input voltage across (L) and (N) connectors for 110 VAC. (95 VAC to 135 VAC is acceptable.)
2. Using multimeter, measure output voltage across (+) and (-) (or N/O and N/C) for 27.2 VDC @ 3 amps output.

END OF TASK

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Open door and remove power distribution panel (see WP 0074).

NOTE

Be observant of where out put connections are on battery charger. On older battery chargers output is connected to N/O and N/C connections. On newer battery chargers output is connected to OUTPUT + and OUTPUT – connections.

4. Mark and disconnect terminals (Figure 1, Item 3) from battery charger (Figure 1, Item 2).

REMOVAL - Continued

5. Remove and retain four screws (Figure 1, Item 4), lock washers (Figure 1, Item 5), and flat washers (Figure 1, Item 6) securing battery charger (Figure 1, Item 2) to barrier panel (Figure 1, Item 1).

6. Remove battery charger (Figure 1, Item 2).

END OF TASK

REPLACEMENT

1. Install battery charger (Figure 1, Item 2) and secure to barrier panel (Figure 1, Item 1) using four screws (Figure 1, Item 4), lock washers (Figure 1, Item 5), and flat washers (Figure 1, Item 6).

NOTE

If necessary, refer to (Table 1) or (FO-6 through FO-12) for electrical schematic.

Be observant of output connections on battery charger. On older battery chargers output is connected to N/O and N/C connections. On newer battery chargers output is connected to OUTPUT + and OUTPUT – connections.

2. Connect terminals (Figure 1, Item 3) to battery charger (Figure 1, Item 2).

3. Install power distribution panel (see WP 0074).

4. Connect negative terminal to battery (see WP 0041).

5. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

NOTE

On older battery chargers output is connected to N/O and N/C connections. On newer battery chargers output is connected to OUTPUT + and OUTPUT – connections.

Table 1. Battery Charger Connections.

BATTERY CHARGER TERMINALS	CONNECTION	
	Old Style	**New Style**
COM	no connection	no connection
N/O	39-CM2-12	no connection
N/C	37-TB1-22b-2	no connection
(+) POS	no connection	39-CM2-12
(-) NEG	no connection	37-TB1-22b-2
(⏚) GND	333-GB-3	333-GB-3
L	97-F8-3	97-F8-3
N	328-PTB2-10	328-PTB2-10

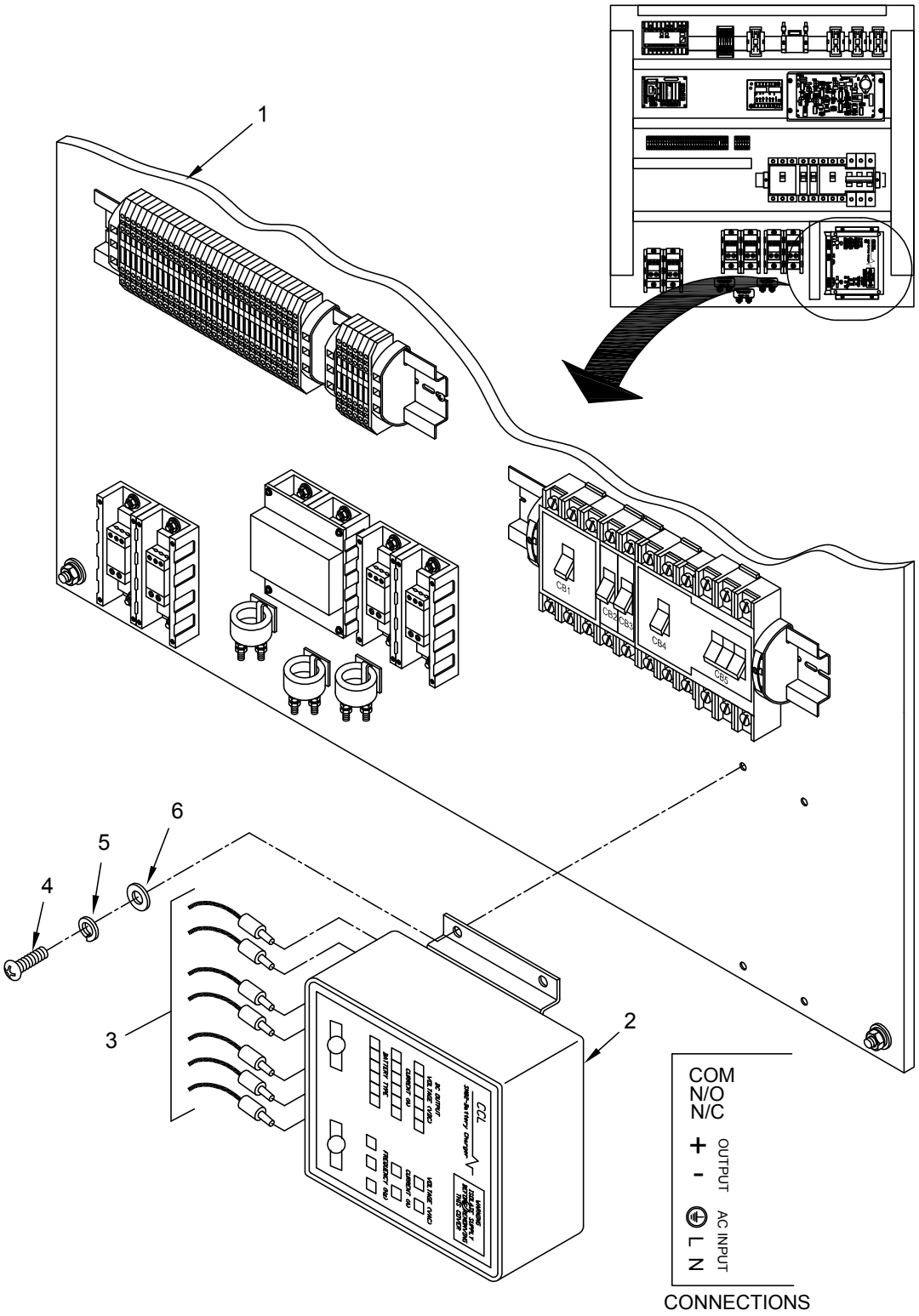


Figure 1. Battery Charger Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET FUEL PANEL

GENERAL

This work package provides information on the removal and replacement of components on the Genset fuel panel. They consist of:

- Fuel selector switch removal and replacement
- Auxiliary fuel line connectors removal and replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables or hoses with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

FUEL SELECTOR SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

Materials/Parts
Fuel selector switch
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

Reference
WP 0005, WP 0041

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

WARNING

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

NOTE

Prior to performing the following procedure, ensure fuel tank is below 3/4 tank.

To ease installation, tag input and output hoses for proper connections prior to performing the following step (see Figure 1 for connections).

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Remove and retain sixteen bolts (Figure 2, Item 5), lock washers (Figure 2, Item 4), and flat washers (Figure 2, Item 3) that secure radiator access panel (Figure 2, Item 2) to Genset (Figure 2, Item 1). Remove radiator access panel (Figure 2, Item 2).
4. Remove and retain locking screw (Figure 2, Item 6) from selector switch handle (Figure 2, Item 7).
5. Remove and retain selector switch handle (Figure 2, Item 7) from selector switch (Figure 2, Item 14).
6. Remove and retain two bolts (Figure 2, Item 8), lock washers (Figure 2, Item 9), and flat washers (Figure 2, Item 10) that secure selector switch (Figure 2, Item 14) to bracket (Figure 2, Item 11).
7. Loosen clamps (Figure 2, Item 12) that secure input and output hoses (Figure 2, Item 13) to selector switch (Figure 2, Item 14).
8. Remove input and output hoses (Figure 2, Item 13) from ports on selector switch (Figure 2, Item 14). Remove selector switch (Figure 2, Item 14).

END OF TASK

REPLACEMENT

1. Inspect input and output hoses (Figure 2, Item 13) and replace as necessary.

2. Install input and output hoses (Figure 2, Item 13) onto proper ports of selector switch (Figure 2, Item 14). Tighten clamps.

3. Place selector switch (Figure 2, Item 14) onto bracket (Figure 2, Item 11) and secure using two bolts (Figure 2, Item 8), lock washers (Figure 2, Item 9), and flat washers (Figure 2, Item 10).

NOTE

If necessary, refer to (Figure 1) for proper connections of input and output hoses.

4. Install selector switch handle (Figure 2, Item 7) and secure using locking screw (Figure 2, Item 6).

5. Install radiator access panel (Figure 2, Item 2) onto Genset (Figure 2, Item 1) and secure using sixteen bolts (Figure 2, Item 5), lock washers (Figure 2, Item 4), and flat washers (Figure 2, Item 3).

6. Connect negative terminal to battery (see WP 0041).

7. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

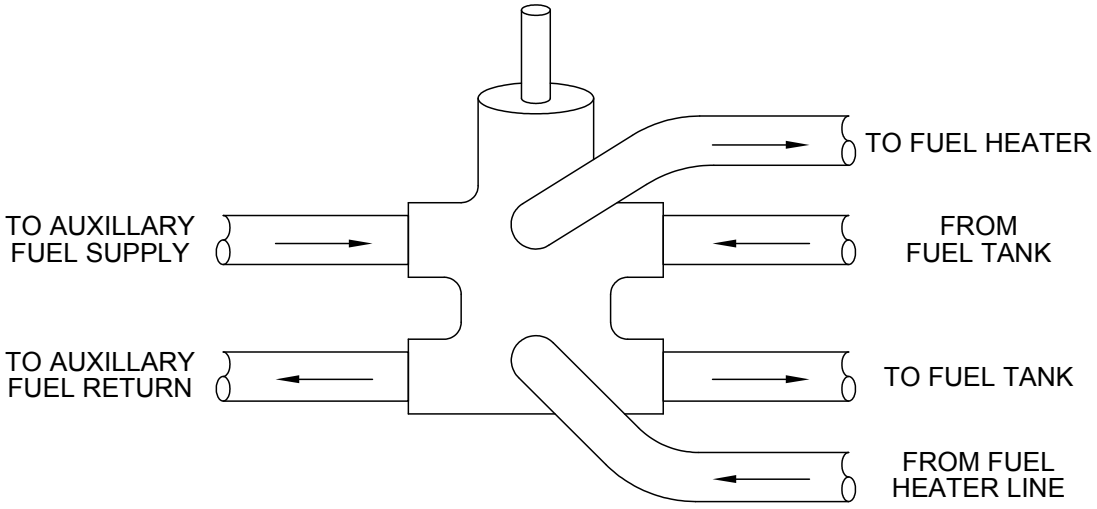


Figure 1. Fuel Selector Switch Connections.

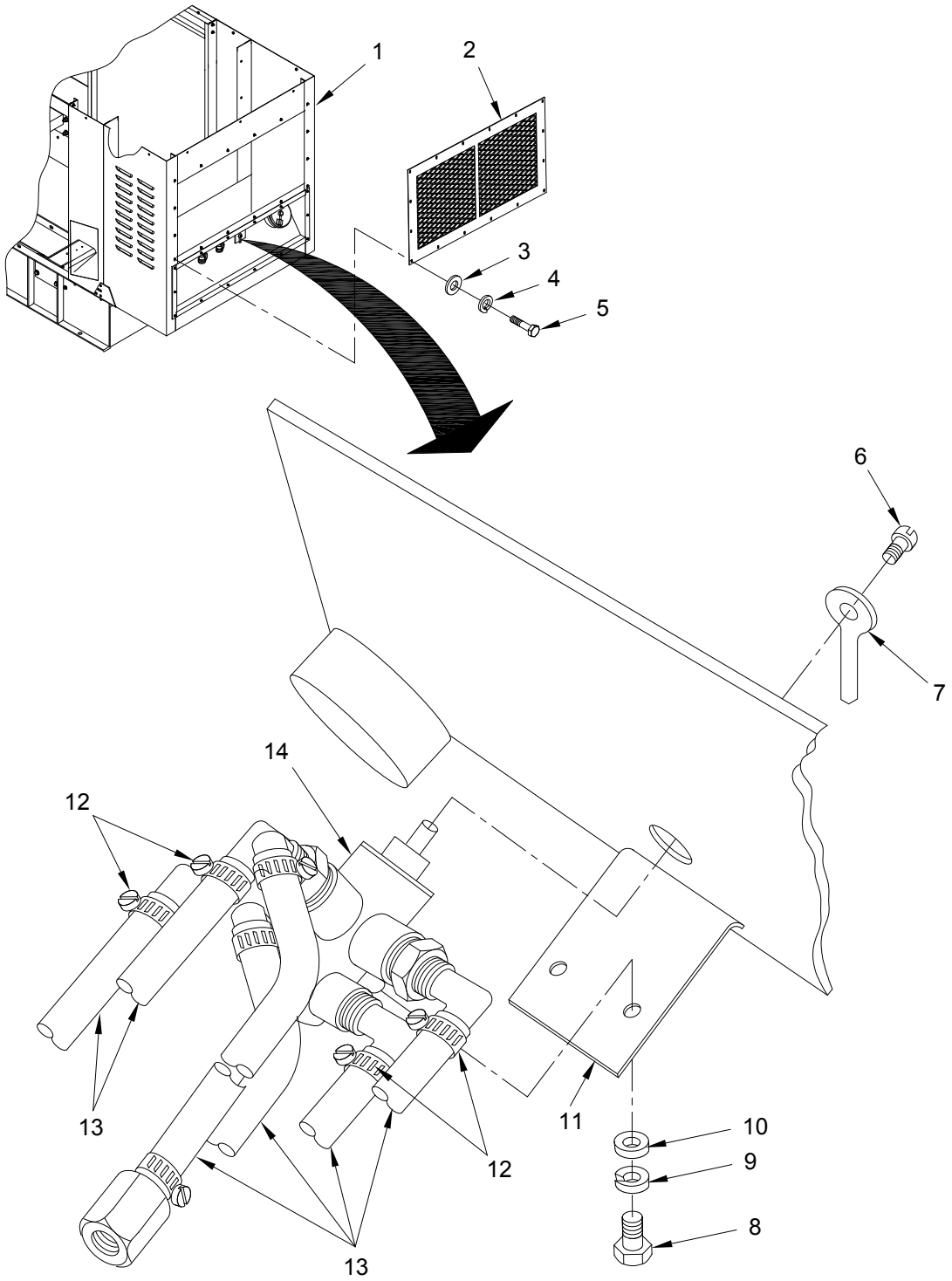


Figure 2. Fuel Selector Switch Removal/Replacement.

END OF TASK

AUXILIARY FUEL PORTS REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

Materials/Parts
Fuel ports
Cloth cleaning (WP 0168, Item 14)
Teflon tape (WP 0168, Item 58)

Personnel Required
One

Reference
WP 0005, WP 0041

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

REMOVAL

NOTE

Prior to performing the following procedure, ensure fuel tank is below 3/4 tank.

To ease installation, tag input and output hoses for proper connection.

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0041).
3. Verify that external hoses have been disconnected from auxiliary fuel port(s) (Figure 3, Item 7).
4. Remove and retain sixteen bolts (Figure 3, Item 5) lock washers (Figure 3, Item 4), and flat washers (Figure 3, Item 3) that secure radiator access panel (Figure 3, Item 2) to Genset (Figure 3, Item 1). Remove radiator access panel (Figure 3, Item 2).
5. Place wrench on 90° elbow (Figure 3, Item 6) to prevent from turning and remove auxiliary fuel port (Figure 3, Item 7) from Z-panel (Figure 3, Item 8).
6. Loosen clamp (Figure 3, Item 10) that secures input/output hose (Figure 3, Item11) to adapter (Figure 3, Item 9).
7. Remove input/output hose (Figure 3, Item11) from adapter (Figure 3, Item 9) and set aside (if necessary place in small container to collect residual fuel).
8. Remove adapter (Figure 3, Item 9).and 90° elbow (Figure 3, Item 6) from auxiliary fuel port (Figure 3, Item 7).

END OF TASK

REPLACEMENT

NOTE

Wrap all threaded joints with teflon tape.

1. Install auxiliary fuel port (Figure 3, Item 7) onto 90° elbow (Figure 3, Item 6) on Z-panel (Figure 3, Item 8) and tighten.
2. Install adapter (Figure 3, Item 9) onto 90° elbow (Figure 3, Item 6).
3. Inspect input/output hoses (Figure 3, Item 11) and replace as necessary.
4. Insert input/output hoses (Figure 3, Item 11) onto adapter (Figure 3, Item 9) and tighten clamp (Figure 3, Item 10).
5. Install radiator access panel (Figure 3, Item 2) onto Genset (Figure 3, Item 1) and secure using sixteen bolts (Figure 3, Item 5), lock washers (Figure 3, Item 4), and flat washers (Figure 3, Item 3).
6. Connect negative terminal to battery (see WP 0041).
7. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

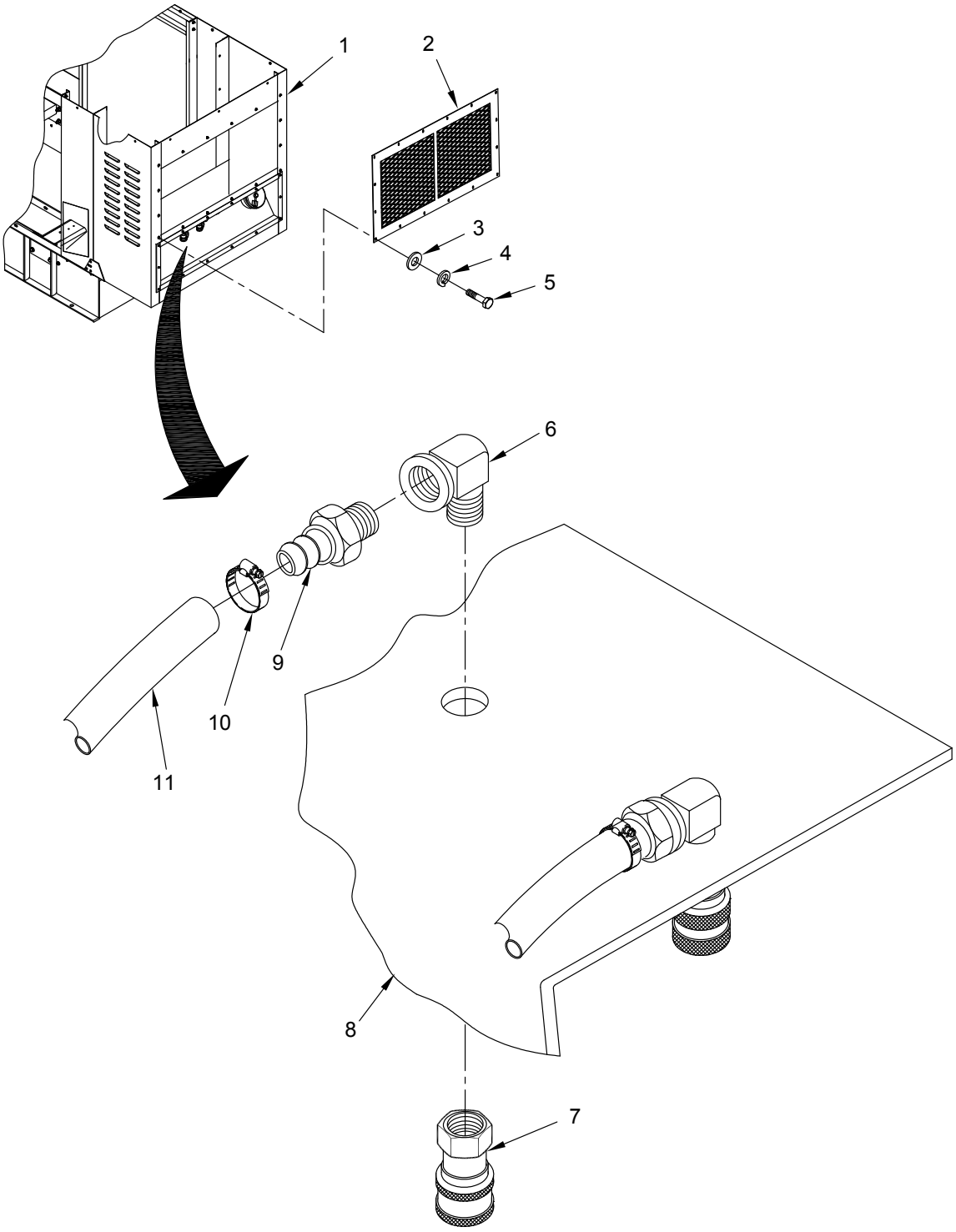


Figure 3. Auxiliary Fuel Port Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET FUEL SYSTEM

GENERAL

This work package provides information on the removal and replacement of the following Genset fuel system components:

- Fuel gauge removal, inspect, and replacement
- Fuel tank removal and replacement
- Fuel hose removal and replacement
- Fuel line heater removal and replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand breaks are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

FUEL GAUGE REMOVAL/INSPECT/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)
Safety glasses

Materials/Parts
Fuel gauge
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

Reference
WP 0005, WP 0041, WP 0045

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel.
3. Remove rear access panel.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

The fuel gauge is a float style fuel gauge.

5. If fuel tank is full, drain off 1/3 of fuel as per (WP 0045).
6. Remove front access panel (Figure 1, Item 3) to gain access to fuel gauge.
7. Using a 1 ¾ inch wrench or pipe wrench, rotate gauge (Figure 1, Item 1) counterclockwise to release.
8. Lift gauge (Figure 1, Item 1) out of fuel tank (Figure 1, Item 2).

END OF TASK

INSPECT

1. Ensure that float has ease of movement.
2. Ensure that two screws are installed in float to provide additional weight.

END OF TASK

REPLACEMENT

1. Insert gauge (Figure 1, Item 1) into hole in fuel tank (Figure 1, Item 2).
2. Using a 1 ¾ inch wrench or pipe wrench, rotate the gauge (Figure 1, Item 1) clockwise to tighten. DO NOT over tighten.
3. Fill fuel tank as per (WP 0045).
4. Check operation of gauge.
5. Clean up any excess spillage from base of the Genset.
6. Reconnect battery ground cable (black) to battery ground terminal (If necessary, refer to procedure in (WP 0041) of this TM).
7. Install rear access panel and cargo restraints.
8. Start Genset as per Genset Power Up Procedure(WP 0005).

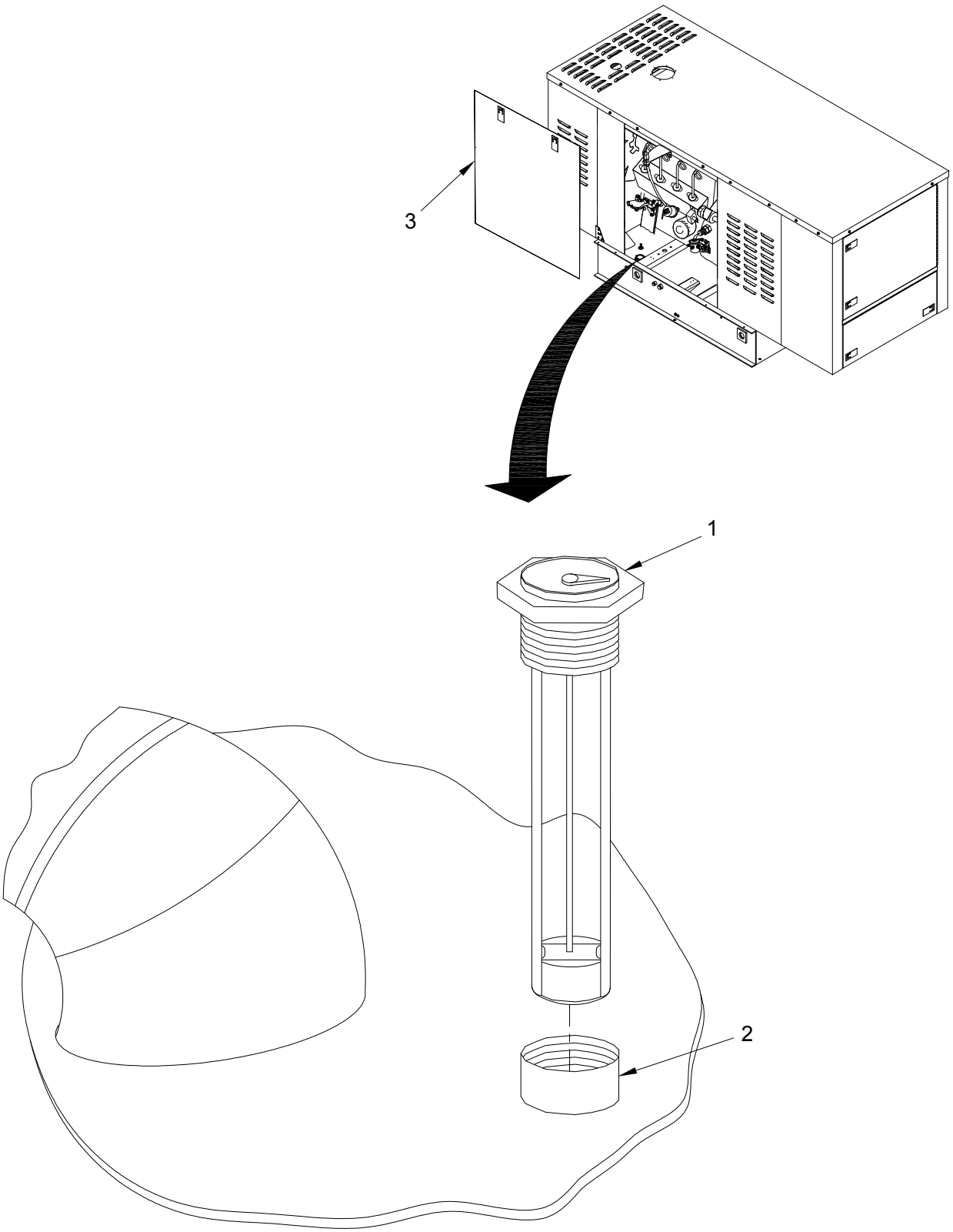


Figure 1. Genset Fuel Gauge Removal/Replacement.

END OF TASK

FUEL TANK REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Fuel tank
Cloth, cleaning (WP 0168, Item 14)
Drain pan
Pry bar
Sealing compound (WP 0168, Item 50)

Personnel Required
Two

Reference
WP 0005, WP 0041, WP 0045, WP 0048, WP 0121, WP 0123

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
Genset Shut Down
BATTERY SWITCH – OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset is in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Remove cargo net (see WP 0121), cargo restraints, and applicable cargo cage sections (see WP 0123) to gain access to cargo.
2. Remove cargo.
3. Remove rear access panels of Genset and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal. If necessary, refer to procedure in (WP 0041) of this TM.
5. Drain fuel tank completely (see WP 0045).

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

6. Using either a flat tip screw driver or socket and ratchet, loosen the fuel source hose clamp (Figure 2, Items 8) on the fuel source hose (Figure 2, Item 7).
7. Place a drain pan or absorbent pad under the connection to be broken in case of spillage.

REMOVAL – Continued

NOTE

When performing the following step, DO NOT attempt to remove hose from fitting.

8. Grasp the hose (Figure 2, Item 7) and rotate the hose close to the connection to break the connection.
9. Loosen and remove hose connector (Figure 2, Item 6) with an open end wrench.
10. Using either a flat tip screw driver or socket and ratchet, loosen the fuel return hose clamp (Figure 2, Items 4) on the fuel return hose (Figure 2, Item 5).
11. Place a drain pan or absorbent pad under the connection to be broken in case of spillage.

NOTE

When performing the following step, DO NOT attempt to remove hose from fitting.

12. Grasp the hose (Figure 2, Item 5) and rotate the hose close to the connection to break the connection.
13. Loosen and remove hose connector (Figure 2, Item 3) with an open end wrench.
14. Using either a flat tip screw driver or socket and ratchet, loosen the two fuel filler hose clamps (Figure 2, Items 2) on the fuel filler hose (Figure 2, Item 1).
15. Loosen the Genset heater (hydronic) fuel hose clamp (Figure 2, Item 19).
16. Remove the Genset heater (hydronic) fuel hose from the fuel tank.
17. Loosen the ECU heater (hydronic) fuel hose clamp (Figure 2, Item 17).
18 Remove the ECU heater (hydronic) fuel hose from the fuel tank.
19. Remove two mounting bolts (Figure 2, Item 13), four washers (Figure 2, Item 14), two spacers (Figure 2, Item 9) and two lock nuts (Figure 2, Item 15) securing both brackets to roadside of fuel tank (Figure 2, Item 26) to enclosure base.
20. Disconnect internal chassis ground from Genset and trailer ground.
21. Loosen but do not remove two mounting bolts (Figure 2, Item 11) securing curbside of fuel tank (Figure 2, Item 26) to enclosure base.
22. Remove four mounting bolts (Figure 2, Item 24), eight flat washers (Figure 2, Item 22) and four lock nuts (Figure 2, Item 21) from road side fuel tank support strut (Figure 2, Item 23).
23. Remove one bolt (Figure 2, Item 25), two washers (Figure 2, Item 27), and lock nut (Figure 2, Item 29) from each side of Genset enclosure support bracket (curbside). See (Figure 2) for bolt location on each side of enclosure support bracket.
24. Rotate drain valve (Figure 2, Item 18) to clear fuel tank support strut (Figure 2, Item 23) opening.
25. Lift tank (Figure 2, Item 26) to clear drain valve (Figure 2, Item 18) and remove support strut (Figure 2, Item 23).

REMOVAL – Continued

26. Remove two mounting bolts (Figure 2, Item 11), four washers (Figure 2, Item 10), two spacers (Figure 2, Item 9) and two lock nuts (Figure 2, Item 12) securing both sides of fuel tank (Figure 2, Item 26) to enclosure base (curbside).

27. To remove fuel filler hose (Figure 2, Item 1) from fuel tank port (Figure 2, Item 30), pry the fuel tank away from the enclosure wall using a pry bar, loosening fuel filler hose from fuel tank port (Figure 2, Item 30).

28. Once fuel filler hose is free from fuel tank port, lower fuel tank until tank rests on L-bracketed I-beams of trailer frame.

NOTE

The Genset enclosure must be removed from the trailer bed for the fuel tank to be removed.

29. Remove Genset from trailer bed, perform steps 6, 8 through 13 of Genset Removal (WP 0086) of this TM,.

WARNING

Empty fuel tank weighs 33 pounds and may require two persons to safely remove to avoid injury to personnel.

30. Remove fuel tank (Figure 2, Item 26) from trailer bed.

31. Remove and retain fuel gauge (Figure 2, Item 28), connectors (Figure 2, Items 16, and 20), and drain valve (Figure 2, Item 18) for use on replacement tank.

END OF TASK

REPLACEMENT

WARNING

Empty fuel tank weighs 33 pounds and may require two persons to safely replace tank to avoid injury to personnel.

NOTE

When replacing heater (hydronic) fuel hose connectors (Figure 2, Items 16 and 20), ensure connector is oriented so that inserted fuel pickup line rests on the bottom of fuel tank.

When replacing heater (hydronic) fuel hose connectors (Figure 2, Items 16 and 20), apply a thin layer of sealing compound to connector threads.

1. Inspect, replace if necessary, and install fuel gauge (Figure 2, Item 28), connectors (Figure 2, Items 16, and 20), and drain valve (Figure 2, Item 18) in replacement fuel tank.

2. Place replacement fuel tank (Figure 2, Item 26) in approximate location in trailer bed.

CAUTION

When lowering Genset enclosure onto trailer bed, ensure fuel tank top brackets clear enclosure frame.

REPLACEMENT – Continued

3. Reposition Genset enclosure on trailer as per Genset Replacement, steps 5 through 8, 10, and 11 (WP 0086) of this TM,

4. Ensure two fuel filler hose clamps (Figure 2, Item 2) are loosely positioned on fuel filler hose (Figure 2, Item 1) and press fuel filler hose (Figure 2, Item 1) onto fuel tank port (Figure 2, Item 30). DO NOT tighten hardware at this time.

5. Insert two mounting bolts (Figure 2, Item 11), four washers (Figure 2, Item 10), two spacers (Figure 2, Item 9), and two lock nuts (Figure 2, Item 12) through curbside fuel tank (Figure 2, Item 26) mounting bracket. DO NOT tighten at this time.

6. Ensure drain valve (Figure 2, Item 18) is rotated away from support strut (Figure 2, Item 23) opening.

7. Lift tank (Figure 2, Item 26) to clear drain valve (Figure 2, Item 18) and slide support strut (Figure 2, Item 23) along trailer infrastructure into position.

8. Insert four mounting bolts (Figure 2, Item 24), eight flat washers (Figure 2, Item 22), and four lock nuts (Figure 2, Item 21) into each roadside support strut mounting bracket. DO NOT tighten.

9. Insert two mounting bolts (Figure 2, Item 13), four washers (Figure 2, Item 14), two spacers (Figure 2, Item 9) and two lock nuts (Figure 2, Item 15) securing both sides of fuel tank (Figure 2, Item 26) (roadside) to enclosure base.

10. Tighten all mounting hardware of fuel tank (Figure 2, Item 26) and support strut (Figure 2, Item 23).

11. Install one bolt (Figure 2, Item 25), two washers (Figure 2, Item 27), and lock nut (Figure 2, Item 29) to each side of Genset enclosure support bracket (curbside).

NOTE

Over tightening the hose clamps can result in damage to the hose and premature failure.

12. Install the ECU heater (hydronic) fuel hose (Figure 2, Item 17) onto the ECU heater (hydronic) fuel connector (Figure 2, Item 16) and tighten clamp.

13. Install the Genset heater (hydronic) fuel hose (Figure 2, Item 19) onto the Genset heater (hydronic) fuel connector (Figure 2, Item 20) and tighten clamp.

14. Slide two fuel hose clamps (Figure 2, Item 2) into position over fuel filler hose (Figure 2, Item 1) and fuel tank port (Figure 2, Item 30) and tighten.

15. Install the fuel source connector (Figure 2, Item 6), with fuel source hose (Figure 2, Item 7) attached, into fuel tank (Figure 2, Item 26) using an open end wrench. Tighten fuel source hose clamp (Figure 2, Item 8).

16. Install the fuel return connector (Figure 2, Item 3), with fuel return hose (Figure 2, Item 5) attached, into fuel tank (Figure 2, Item 26) using an open end wrench. Tighten fuel return hose clamp (Figure 2, Item 4).

17. Connect battery ground cable (black) to battery ground terminal. If necessary, refer to procedure in (WP 0041) of this TM.

18. Ensure drain valve (Figure 2, Item 18) is shut. Fill tank with fuel and check for leaks.

19. Perform all necessary PMCS (refer to WP 0019 and WP 0037) on engine.

REPLACEMENT – Continued

20. Prime engine as described in (WP 0048) and start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

21. Install access panels.

22. Install cargo and cargo restraints.

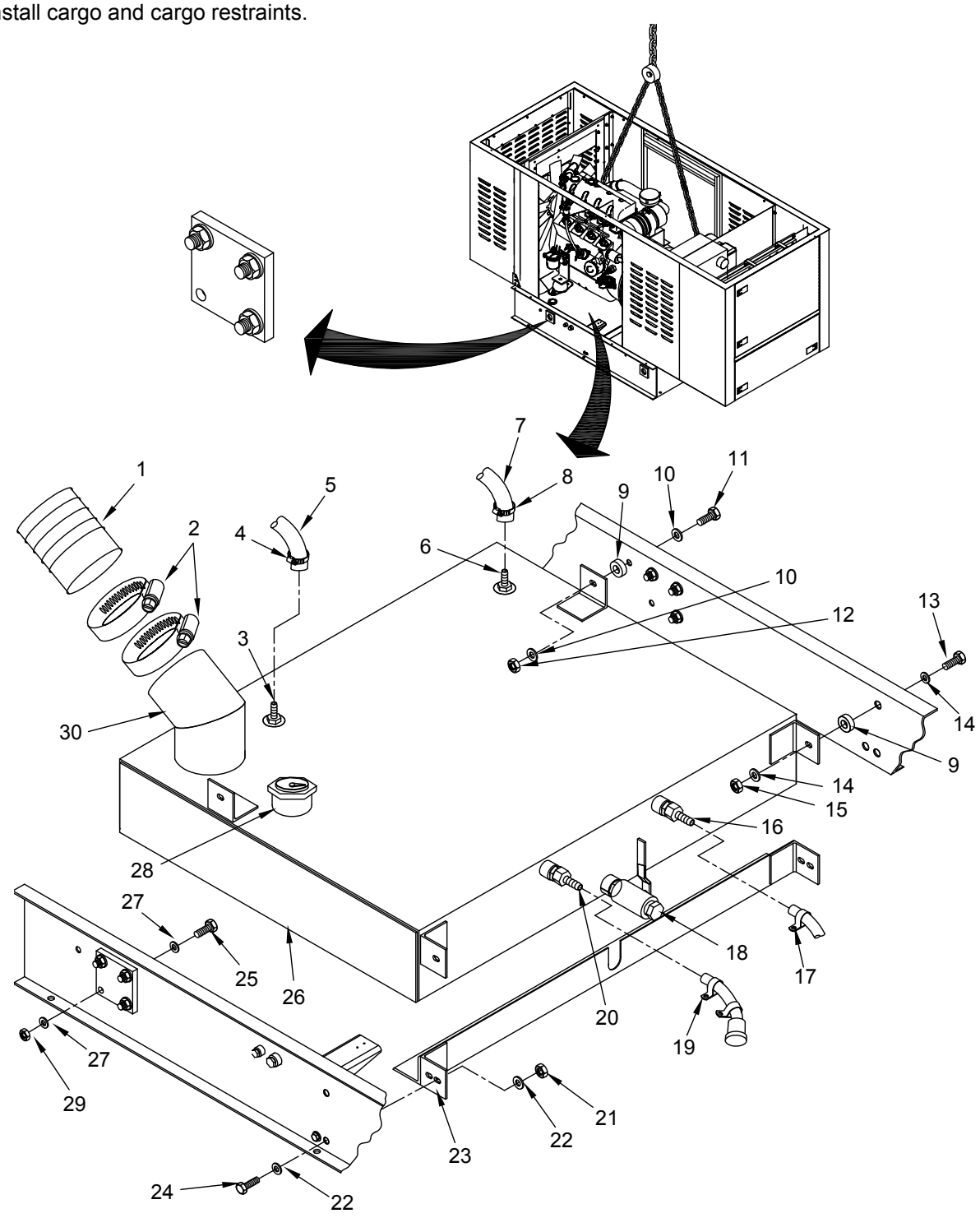


Figure 2. Genset Fuel Tank Removal/Replacement.

END OF TASK

FUEL HOSE REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Fuel hose
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

Reference
WP 0005, WP 0041, WP 0048
WP 0139, WP 0141

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel.
3. Remove front and rear access panels.
4. Disconnect battery ground cable (black) from battery ground terminal (If necessary, refer to procedure in (WP 0041) of this TM).

NOTE

Identify the fuel hose to be replaced. Refer to (WP 0139) and (WP 0141) for location and part number of the various fuel hoses.

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

5. Loosen both ends of the fuel hose to be replaced.
6. Place a drain pan or absorbent pad under the connection to be broken in case of spillage.
7. Pull the fuel hose away from the connector. Repeat for other end of fuel hose.
8. Discard hose but retain workable hardware.

END OF TASK

REPLACEMENT

NOTE

Ensure that replacement hose is the same length and diameter of the original hose.

Identify the fuel hose to be replaced. Refer to (WP 0139) and (WP 0141) for location and part number of the various fuel hoses.

Ensure that the hose clamps are placed on the hose in such a way that the screws will be accessible once slid into place.

1. Install fuel hose onto the first connection using retained hardware.
2. Repeat for other end of fuel hose.
3. Ensure hose is not twisted.
4. Tighten connections.

NOTE

Over tightening a hose can result in damage to the hose and premature failure.

5. Clean up any excess spillage from base of the Genset.
6. Reconnect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).
7. Install front and rear access panels and cargo restraints.
8. Start Genset as per Genset Power Up Procedure (WP 0005).
9. Prime fuel system as per (WP 0048).

END OF TASK

FUEL LINE HEATER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Fuel line heater
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

Reference
WP 0005, WP 0041, WP 0048, WP 0052

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
Genset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel.
3. Remove front and rear access panel.
4. Disconnect battery ground cable (black) from battery ground terminal (If necessary, refer to procedure in (WP 0041) of this TM).

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

5. Remove and retain twelve bolts (Figure 3, Item 6), lock washers (Figure 3, Item 7), and flat washers (Figure 3, Item 8) that secure radiator access panel (Figure 3, Item 5) to Genset. Remove radiator access panel (Figure 3, Item 5).
6. Disconnect fuel heater line (Figure 3, Item 10) from the fuel selector switch (Figure 3, Item 9) behind fuel control panel (Figure 3, Item 4).
7. Disconnect fuel filter line (Figure 3, Item 2) from fuel heater line (Figure 3, Item 10).

REMOVAL – Continued

8. Disconnect fuel heater controller (Figure 3, Item 11) from K4 solenoid (Figure 3, Item 1). Refer to (WP 0052, Table 1) for electric connections of the K4 solenoid. Label unmarked wiring for future installation.

9. Remove fuel heater controller (Figure 3, Item 11) and fuel heater line (Figure 3, Item 10).

END OF TASK

REPLACEMENT

1. Connect fuel heater controller (Figure 3, Item 11) and fuel heater line (Figure 3, Item 10) to K4 solenoid (Figure 3, Item 1). Refer to (WP 0052, Table 1) for electric connections of the K4 solenoid.

2. Secure fuel heater controller wires to wiring harness with zip ties.

3. Connect fuel filter line (Figure 3, Item 2) to fuel heater line (Figure 3, Item 10).

4. Connect fuel heater line (Figure 3, Item 10) to the fuel selector switch (Figure 3, Item 9) behind fuel control panel (Figure 3, Item 4).

5. Install radiator access panel (Figure 3, Item 5) onto Genset and secure using twelve bolts (Figure 3, Item 6), lock washers (Figure 3, Item 7), and flat washers (Figure 3, Item 8).

6. Reconnect battery ground cable (black) to battery ground terminal (if necessary, refer to procedure in (WP 0041) of this TM).

7. Install front and rear access panels and cargo restraints.

8. Start Genset as per Genset Power Up Procedure (WP 0005).

9. Prime fuel system as per (WP 0048).

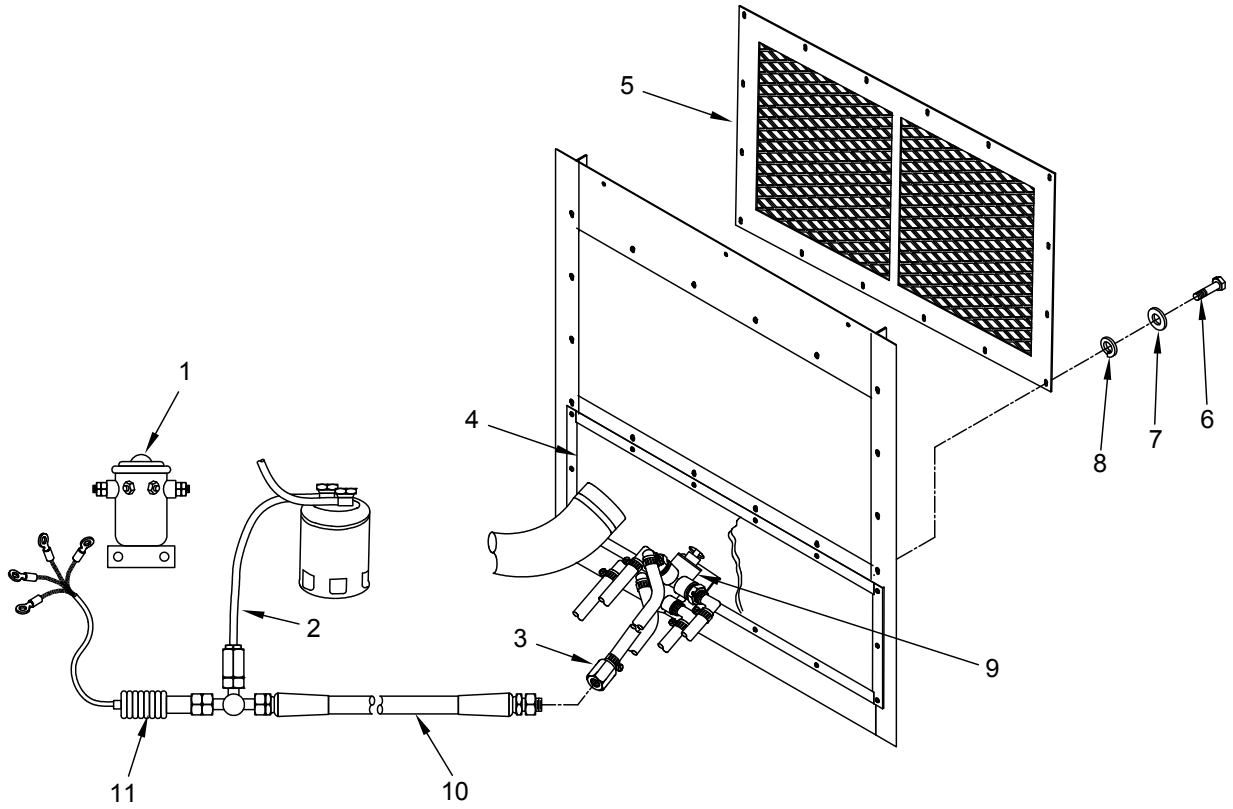


Figure 3. Genset Fuel Line Heater Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
GENSET REMOVAL/REPLACEMENT

GENERAL

This work package provides information on the Field maintenance of the Genset. The tasks included in this WP consist of the following:

- Genset Removal/Replacement
- Engine Generator Assembly (EGA) Removal/Replacement
- Separation of Engine from Generator Assembly (EGA)

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the TMSS-MED Genset.

NOTE

If necessary, refer to (Figures FO-1 through FO-5) for electrical schematics and wiring diagrams.

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

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GENSET (including enclosure) – REMOVAL AND REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Lifting Device (Hoist/Tow truck/Crane)
Chains/straps
Safety glasses
Gloves
Support lumber, (4x4, approx. 42", 4 ea.)

Personnel Required
Two

References
WP 0005, WP 0019, WP 0037, WP 0041, WP 0045, WP 0048

Equipment Condition
ECU shut down
Genset shut down
BATTERY SWITCH – OFF
All power cables disconnected from J1 – J6 on Genset

WARNING

The Genset assembly for the TMSS-MED weighs 1350 lbs (612.35 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the Genset without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Prior to performing any maintenance that requires climbing on or under trailer, ensure wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Once the Genset is removed, do not allow unit to hang from lifting device. Failure to observe this warning can result in serious injury or death to personnel or damage to Genset.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to cool down.

Do not enter Genset when operational. Exposed moving parts (i.e. fan blade) present. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

To avoid possibility of counter balance, ensure that tongue jack and jack assemblies are lowered to ground level to support trailer.

REMOVAL

1. Prior to performing the following steps ensure that:
   - Genset has been shut down in accordance with Genset Shut Down Procedure (WP 0005).
   - ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
   - Genset is at ambient temperature.
   - All cables have been disconnected from power distribution panel on Genset.
   - If applicable, disconnect auxiliary fuel lines from Genset.
   - Fuel has been drained (see WP 0045).
   - Trailer is level.
   - Wheels are chocked.
   - All bags have been removed, trailer and immediate area around Genset is free and clear of Items (i.e., storage bags, ground cables, etc.).
   - Ample room to operate lifting device, maneuver and place Genset is present.

REMOVAL – Continued

2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 1, Item 4) of Genset (Figure 1, Item 10).

3. Remove access doors (Figure 1, Items 4 and 9) of Genset (Figure 1, Item 10) and set aside.

4. Disconnect battery ground cable (black) from battery ground terminal. If necessary, refer to procedure in (WP 0041) of this TM.

5. Loosen hose clamp and disconnect fuel line (Figure 1, Item 8) going to hydronic heater of ECU. Disconnect fuel line (Figure 1, Item 8) and place into spill bucket. Plug lines coming from fuel tank to avoid excessive spillage of fuel.

6. Disconnect ground cable from external ground stud on Genset (Figure 1, Item 10).

7. Disconnect internal chassis ground from Genset (Figure 1, Item 10) and trailer ground.

8. Loosen but do not remove nut (Figure 1, Item 3) and bolt (Figure 1, Item 2) that secures exhaust pipe cap (Figure 1, Item 1). Remove exhaust pipe cap (Figure 1, Item 1) and set aside.

9. Remove and retain 20 bolts (Figure 1, Item 11), lock washers (Figure 1, Item 12) and twelve flat washers (Figure 1, Item 13) that secure top access panel (Figure 1, Item 14) to Genset (Figure 1, Item 10). Remove top access panel (Figure 1, Item 14) and set aside.

10. Remove and retain six bolts (Figure 1, Item 7), six lock nuts (Figure 1, Item 6) and twelve flat washers (Figure 1, Item 5) from bottom of Genset (Figure 1, Item 10).

11. Attach chain/sling to the two lift points (Figure 1, Items 15 and 16). One lift point (Figure 1, Item 15) is located on the engine and one lift point (Figure 1, Item 16) is located on the generator.

NOTE

When performing the following step, ensure that area where Genset is to be placed is dry and level. Ensure that supports allow adequate room below Genset so that no Items on bottom become damaged.

12. Place supports (i.e., treated lumber) along ground for Genset (Figure 1, Item 10) to be placed on once removed from trailer.

CAUTION

When performing the following step, guides should be observant of Genset to ensure no pieces from Genset and/or trailer get caught while lifting is in process.

When performing the following step, guides should be observant of Genset to ensure supports are properly placed and that nothing on Genset gets damaged when placing Genset onto supports.

13. Using a suitable lifting device, raise Genset (Figure 1, Item 10) off of trailer and place on supports. Once Genset (Figure 1, Item 10) is safely lowered, remove chain/sling from two lift points.

END OF TASK

REPLACEMENT

NOTE

It is assumed that the Genset has been removed from any shipping crates and is "loose" waiting to be installed onto the TMSS-MED trailer.

1. Remove access doors (Figure 1, Items 4 and 9) of Genset (Figure 1, Item 10) and set aside.
2. Disconnect battery ground cable (black) from battery ground terminal. If necessary, refer to procedure in (WP 0041) of this TM.
3. Loosen but do not remove nut (Figure 1, Item 3) and bolt (Figure 1, Item 2) that secures exhaust pipe cap (Figure 1, Item 1). Remove exhaust pipe cap (Figure 1, Item 1) and set aside.
4. Remove and retain 20 bolts (Figure 1, Item 11), lock washers (Figure 1, Item 12) and flat washers (Figure 1, Item 13) that secure top access panel (Figure 1, Item 14) to Genset (Figure 1, Item 10). Remove top access panel (Figure 1, Item 14) and set aside.
5. Attach chain/sling to the two lift points (Figure 1, Items 15 and 16). One lift point (Figure 1, Item 15) is located on the engine and one lift point (Figure 1, Item 16) is located on the generator.

CAUTION

When performing the following step, guides should be observant of Genset to ensure proper positioning of Genset and that no pieces from Genset and/or trailer get caught while lowering Genset onto trailer.

Use caution when lowering Genset to avoid damage to ground rods and/or ground rod brackets.

6. Using a suitable lifting device, raise Genset (Figure 1, Item 10). Insert three bolts (Figure 1, Item 7) and three washers (Figure 1, Item 5) in rear mounting holes of Genset enclosure to be used as guides for mounting holes while lowering Genset enclosure onto trailer bed.
7. With Genset (Figure 1, Item 10) in place on trailer, insert remaining three bolts (Figure 1, Item 7) and washers (Figure 1, Item 5) in front mounting holes of Genset enclosure.
8. Install six lock nuts (Figure 1, Item 6) and flat washers (Figure 1, Item 5) and secure Genset (Figure 1, Item 10) to trailer.
9. Once Genset (Figure 1, Item 10) is secured to trailer, remove chain/sling from two lift points (Figure 1, Items 15 and 16).
10. Connect fuel line (Figure 1, Item 8) from hydronic heater of ECU to fuel tank connector (WP 0085, Figure 2, Item 16) and tighten hose clamp.
11. Replace top access panel (Figure 1, Item 14) onto Genset and secure using 20 bolts (Figure 1, Item 11), lock washers (Figure 1, Item 12), and flat washers (Figure 1, Item 13).
12. Install exhaust pipe cap (Figure 1, Item 1) and tighten nut (Figure 1, Item 3) and bolt (Figure 1, Item 2) that secures exhaust pipe cap (Figure 1, Item 1).
13. Connect battery ground cable (black) to battery ground terminal. If necessary, refer to procedure in (WP 0041) of this TM.
14. Fill tank with fuel and check for leaks.

REPLACEMENT - Continued

15. Perform all necessary PMCS (refer to WP 0019 and WP 0037) on engine.

16. Prime engine as described in (WP 0048) and start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

17. Install two access panels (Figure 1, Items 4 and 9).

18. Install cargo restraints (not shown).

END OF TASK

RETURNING GENSET ENCLOSURE TO SUSTAINMENT MAINTENANCE LEVEL

1. Replace top access panel (Figure 1, Item 14) onto Genset and secure using 20 bolts (Figure 1, Item 11), lock washers (Figure 1, Item 12) and flat washers (Figure 1, Item 13).

2. Install exhaust pipe cap (Figure 1, Item 1) and tighten nut (Figure 1, Item 3) and bolt (Figure 1, Item 2) that secures exhaust pipe cap (Figure 1, Item 1).

3. Install access doors (Figure 1, Items 4 and 9) onto Genset (Figure 1, Item 10).

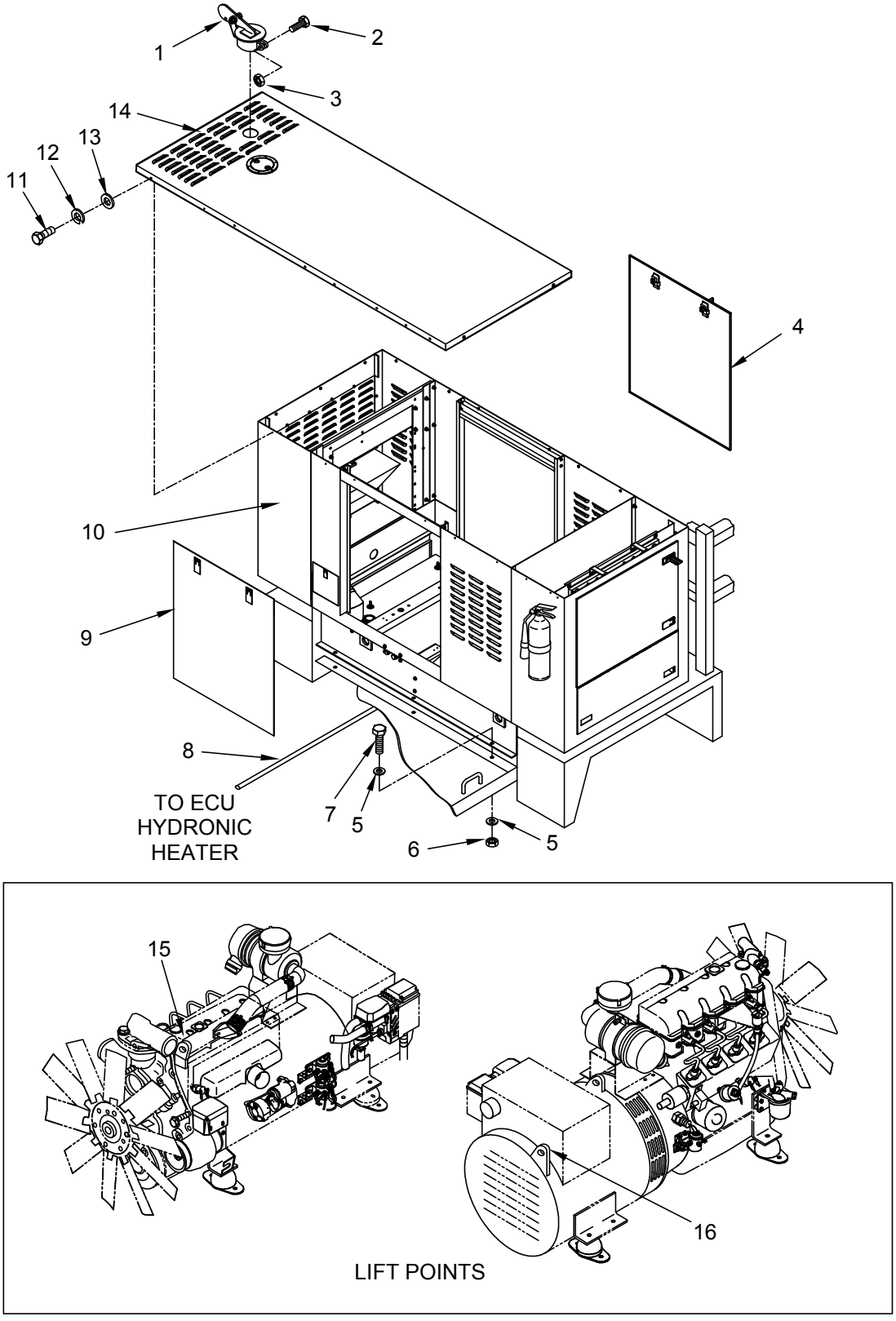


Figure 1. Genset Removal/Replacement.

END OF TASK

ENGINE GENERATOR ASSEMBLY – REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Standard Automotive Tool Set (WP 0165, Item 5)
Lifting Device (Hoist/Tow truck/Crane)
Chains/straps
Drain pans
Safety glasses/face shield

Materials/Parts
Coolant (WP 0168, Item 2)
Cloth, cleaning (WP 0168, Item 14)
Rubber gloves (WP 0168, Item 24)
Oil (WP 0168, Items 35 or 36)
Teflon tape (WP 0168, Item 58)
Strap ties (WP 0168, Items 55 to 57)
Cardboard/plywood

Personnel Required
Two

References
WP 0005, WP 0019, WP 0037, WP 0041, WP 0042, WP 0045, WP 0058, WP 0059, WP 0064, WP 0065, WP 0066, WP 0072, WP 0074, FO-6 through FO-12

Equipment Condition
ECU shut down
Genset shut down
BATTERY SWITCH – OFF
All power cables disconnected

REMOVAL

WARNING

The engine generator assembly (EGA) weighs 1020 lbs (462.66 kg). The engine weighs 680 lbs (308.44 kg) and the generator weighs 340 lbs (154.22 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the engine or generator without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Prior to performing any maintenance that requires climbing on or under trailer, ensure wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Once the EGA is removed, do not allow unit to hang from lifting device. Failure to observe this warning can result in serious injury or death to personnel or damage to EGA.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to cool down.

Do not enter Genset when operational. Exposed moving parts (i.e. fan blade) present. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

To avoid possibility of counter balance, ensure that tongue jack and jack assemblies are lowered to ground level to support trailer.

Preparation

1. Prior to performing the following steps ensure that:
   - Genset has been shut down in accordance with Genset Shut Down Procedure (WP 0005).
   - ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
   - Genset is at ambient temperature.
   - Trailer is level.
   - Wheels are chocked.
   - All electrical cables have been disconnected from power distribution panel on Genset.
   - If applicable, auxiliary fuel lines have been disconnected from Genset.
   - All bags have been removed trailer and immediate area around Genset is free and clear of Items (i.e., storage bags, ground cables, etc.).
   - Ample room to operate lifting device, maneuver and place Genset is present.

2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 2, Item 5) of Genset (Figure 2, Item 7).

3. Remove access doors (Figure 2, Items 5 and 6) of Genset (Figure 2, Item 7) and set aside.

4. Loosen but do not remove nut (Figure 2, Item 3) and bolt (Figure 2, Item 2) that secures exhaust pipe cap (Figure 2, Item 1). Remove exhaust pipe cap (Figure 2, Item 1) and set aside.

5. Remove and retain 20 bolts (Figure 2, Item 12), lock washers (Figure 2, Item 13) and flat washers (Figure 2, Item 14) that secure top access panel (Figure 2, Item 4) to Genset (Figure 2, Item 7). Remove top access panel (Figure 2, Item 4) and set aside.

6. Remove and retain 16 bolts (Figure 2, Item 11), lock washers (Figure 2, Item 10) and flat washers (Figure 2, Item 9) that secure radiator access panel (Figure 2, Item 8) to Genset (Figure 2, Item 7). Remove radiator access panel (Figure 2, Item 8) and set aside.

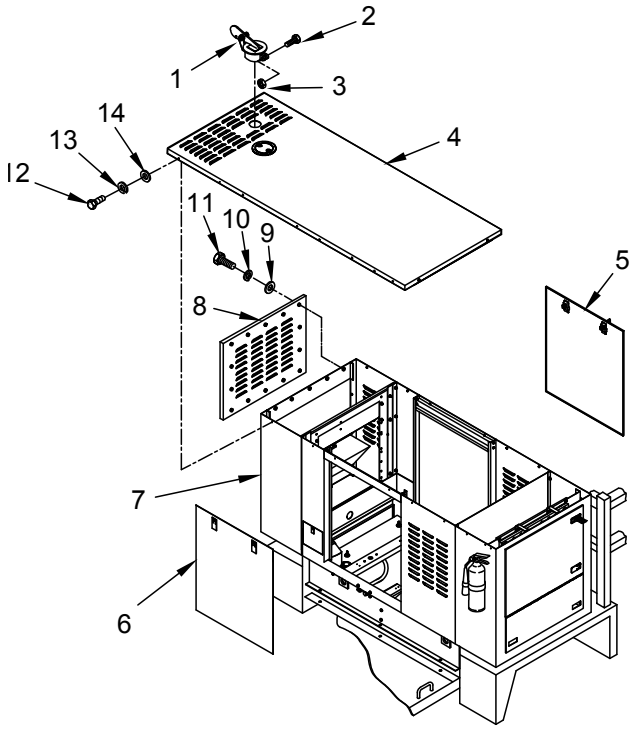


Figure 2. Preparation for Engine/Generator Removal/Replacement.

END OF TASK

Removing Electrical Connections

NOTE

Once steps 1 through 3 have been completed, cover battery terminals with a non-conductive material (i.e., clean rag or towel) to prevent possibility of accidental shorting.

1. Disconnect battery ground cable (black) (Figure 3, Item 12) from battery negative(–) terminal. If necessary, refer to procedure in (WP 0041) of this TM.

2. Disconnect starter cable (Figure 3, Item 10), hydronic heater cable (Figure 3, Item 11 and J6 cable (Figure 3, Item 9) from positive battery terminal. If necessary, refer to procedure in (WP 0041) of this TM.

3. Disconnect fuse (Figure 3, Item 13) from battery terminals. If necessary, refer to (WP 0041) of this TM.

4. Disconnect battery cable (red) (Figure 3, Item 10) from starter (Figure 3, Item 17). Follow cable around engine. Remove and retain any cable clamps and associated hardware securing the cable.

5. Disconnect ground cable (black) (Figure 3, Item 12) from engine. Follow cable around engine. Remove and retain any cable clamps and associated hardware securing the cable.

6 Loosen four bolts (Figure 3, Item 8) that secure generator cover (Figure 3, Item 7). Remove generator cover (Figure 3, Item 7) and set aside.

7. Remove and retain four nuts (Figure 3, Item 3) and lock washers (Figure 3, Item 4) that secure (Figure 3, Item 2) wires (red, white, blue, and black) to output side of generator.

NOTE

Prior to performing the following steps, ensure that four wires (red, white, blue, and black) and associated terminals are appropriately marked for easy connection during replacement.

If necessary refer to schematics, (Figures FO-6 through FO-12).

When performing step 8 do not remove black wires going to interior generator coil.

8. Mark and disconnect four wires (Figure 3, Item 2) (red, white, blue, and black) from output side of generator, routed through harness to circuit breaker CB5 on barrier panel.

9. Install four nuts (Figure 3, Item 3) and lock washers (Figure 3, Item 4) back onto terminals of generator securing black generator coil wires to terminal.

10. Remove and retain screw (Figure 3, Item 5) that secures ground wire (green) (Figure 3, Item 6) to generator. Return screw to generator.

11. Remove circuit breaker cover from Genset bottom control panel as described in step 3 of Removal procedure of (WP 0072).

12. Remove power distribution panel as described in (WP 0074).

NOTE

If necessary refer to (Table 1) or schematics, (Figures FO-6 through FO-12).

13. Mark and disconnect three wires (Figure 3, Item 2) (red, blue, and black) from input side of circuit breaker CB5 of barrier panel.

Removing Electrical Connections – Continued

14. Mark and disconnect white wire from neutral terminal block (PTB2) of barrier panel.

15. Mark and disconnect green wire from ground terminal block (GB) of barrier panel.

Table 1. Generator to Barrier Panel Wiring Connections.

Wire Color	Barrier Panel Connection/Identifier	Generator Connection
Black	248-CB5-2	T7
Red	249-CB5-4	T8
Blue	250-CB5-6	T9
White	247-PTB2-TP	T4,T5,T6
Green	218-GB-13	GGL (Generator junction box)

16. Remove jam nut (Figure 3, Item 24) securing conduit (Figure 3, Item 1) to barrier panel (Figure 3, Item 25). Disconnect conduit (Figure 3, Item 1) from barrier panel (Figure 3, Item 25).

17. Pull five wires (Figure 3, Item 2) (red, white, blue, black and green) disconnected in previous steps through conduit (Figure 3, Item 1). (To avoid damage, pull wires through conduit from barrier panel to generator/engine side).

18. Disconnect CM1 from CF1 (on barrier panel side). Pull harness from barrier panel to generator/engine side.

19. Mark and disconnect two terminals (Figure 3, Item 23).

20. Remove and retain four bolts (Figure 3, Item 22) securing shroud(Figure 3, Item 21) to generator and lay shroud back out of the way.

21. Remove and retain hardware securing ground cable to GROUND on frame of Genset. Disconnect ground cable and replace hardware.

END OF TASK

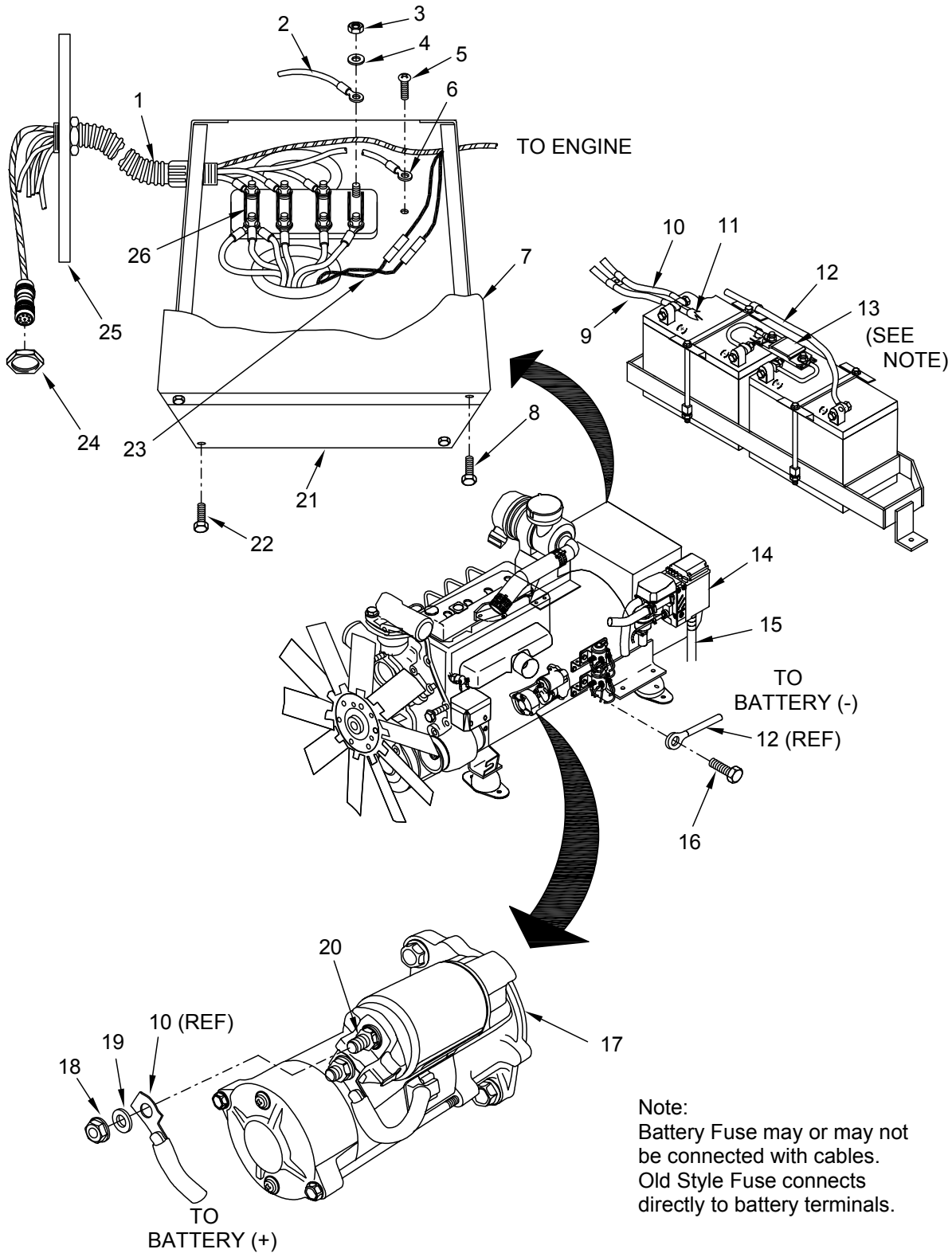


Figure 3. Electrical and Hydronic Heater Connections for Engine/Generator Removal/Replacement.

END OF TASK

Removing Oil Connections

WARNING

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

Collect fluids in appropriate chemical-resistant containers. If disposing of fluids, dispose of properly through local servicing Defense Reutilization and Marketing Office.

Prior to performing the following steps, place absorbent towels under oil pan. =

1. Drain engine oil from LUBE OIL plug (Figure 4, Item 10) as described in (WP 0042).
2. Disconnect drain line (Figure 4, Item 1) from bottom of oil pan (Figure 4, Item 3) and set aside. =
3. Plug oil pan (Figure 4, Item 3).

END OF TASK

Removing Fuel Line Connections

NOTE

Collect fluids in appropriate chemical-resistant containers. If disposing of fluids, dispose of properly through local servicing Defense Reutilization and Marketing Office.

Prior to performing the following steps, place absorbent towels under fuel tank and associated lines being removed.

1. Drain fuel from fuel tank as described in (WP 0045).
2. Remove and retain two mounting bolts (Figure 4, Item 7) and flat washers (Figure 4, Item 6) from bracket (Figure 4, Item 5) supporting the fuel line heater (Figure 4, Item 8) from the side of the engine.
3. Pull back the protective cover (near K4 solenoid) from fuel line heater (Figure 4, Item 9) and remove heat shrink. Mark and disconnect fuel heater electrical connections.
4. Disconnect the inlet fuel line (Figure 4, Item 4) running from fuel line heater (Figure 4, Item 8) to the fuel filter. If necessary, move fuel line heater below I-beam out of the way. If necessary, refer to procedure in (WP 0048) of this TM.
5. Disconnect the engine return fuel line (Figure 4, Item 2) from the fuel injector rail. If necessary, cut any strap ties securing engine return fuel line and move out of the way.

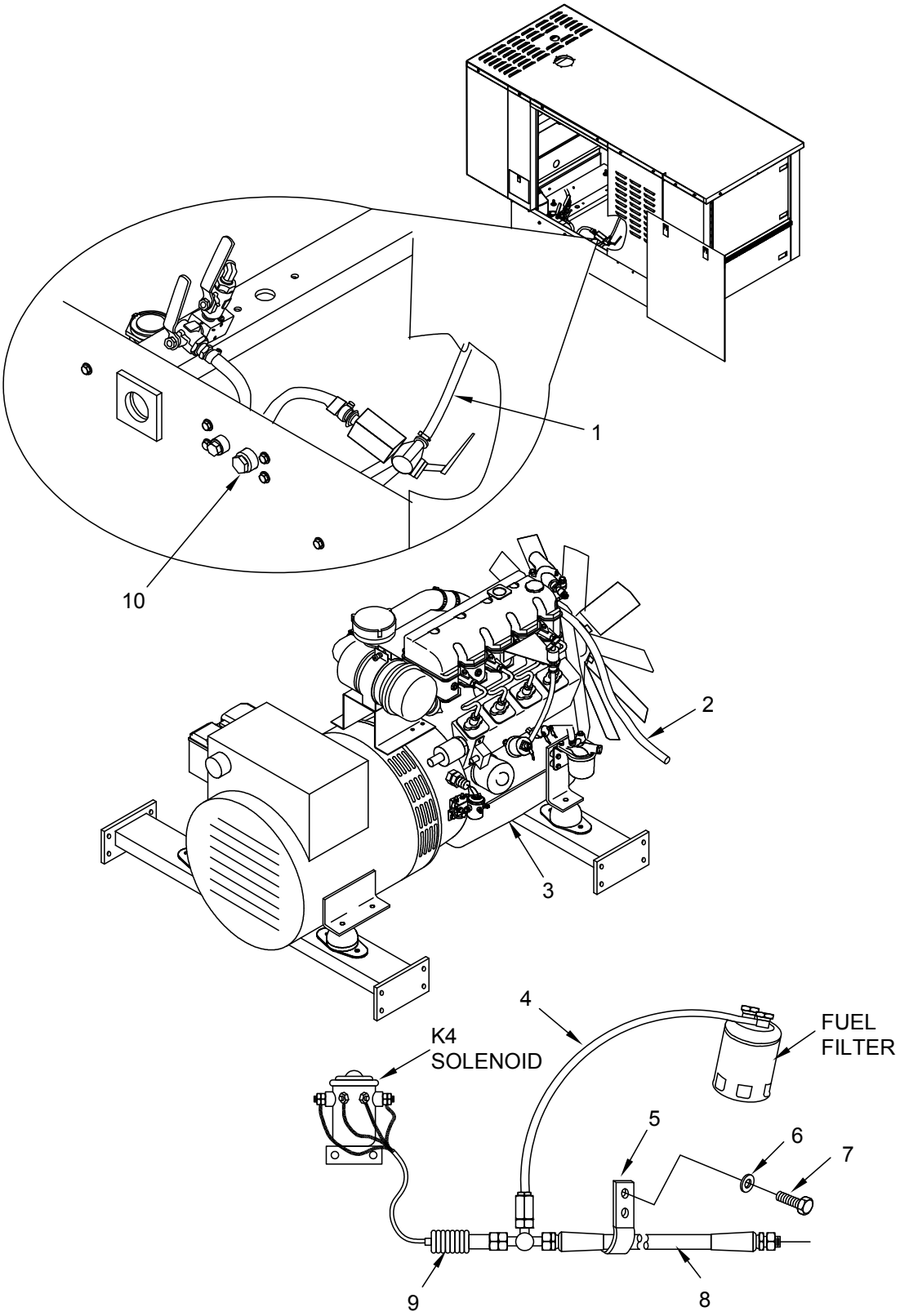


Figure 4. Oil and Fuel Preparation for Engine/Generator Removal/Replacement.

END OF TASK

Removing Radiator Connections

WARNING

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

Collect fluids in appropriate chemical-resistant containers. If disposing of fluids, dispose of properly through local servicing Defense Reutilization and Marketing Office.

Prior to performing the following steps, place absorbent towels under hoses and lines being removed.

1. Drain coolant from COOLANT DRAIN plug (Figure 5, Item 16). If necessary, refer to procedure in (WP 0058) of this TM.
2. Disconnect upper radiator hoses (Figure 5, Item 1) from radiator (Figure 5, Item 2) and water pump. If necessary, refer to procedure in (WP 0059) of this TM.
3. Disconnect lower radiator hose (Figure 5, Item 3) from engine and radiator (Figure 5, Item 2). If necessary, refer to procedure in (WP 0059) of this TM.
4. Remove and retain six bolts (Figure 5, Item 6) that secure outer fan blade cover (Figure 5, Item 7). Remove fan blade cover (Figure 5, Item 7) and set aside.
5. Remove and retain six bolts (Figure 5, Item 5) that secure inner fan blade cover (Figure 5, Item 4). Remove fan blade cover (Figure 5, Item 4) and slide back over fan blades.
6. Remove fan blade from water pump pulley. If necessary, refer to procedure in (WP 0059).
7. Place protective cover (i.e., cardboard, plywood, etc.) over radiator fins to avoid damage during lifting of EGA.
8. Disconnect engine drain line (Figure 5, Item 18) from COOLANT DRAIN plug connection (Figure 5, Item 16) on Genset.

END OF TASK

Removing Exhaust Connection

WARNING

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

If necessary, loosen thermal insulation (Figure 5, Item 13) around exhaust flex pipe (Figure 5, Item 12).

1. Loosen two nuts (Figure 5, Item 11) from clamp/U-bolt (Figure 5, Item 10) and slide exhaust flex pipe (Figure 5, Item 12) from exhaust pipe “T” (Figure 5, Item 9) on exhaust manifold (Figure 5, Item 8). If necessary, refer to procedure in (WP 0066) of this TM.
2. Loosen two nuts (Figure 5, Item 15) from clamp/U-bolt (Figure 5, Item 14) and slide exhaust flex pipe (Figure 5, Item 12) from elbow going to muffler. If necessary, refer to procedure in (WP 0066) of this TM.

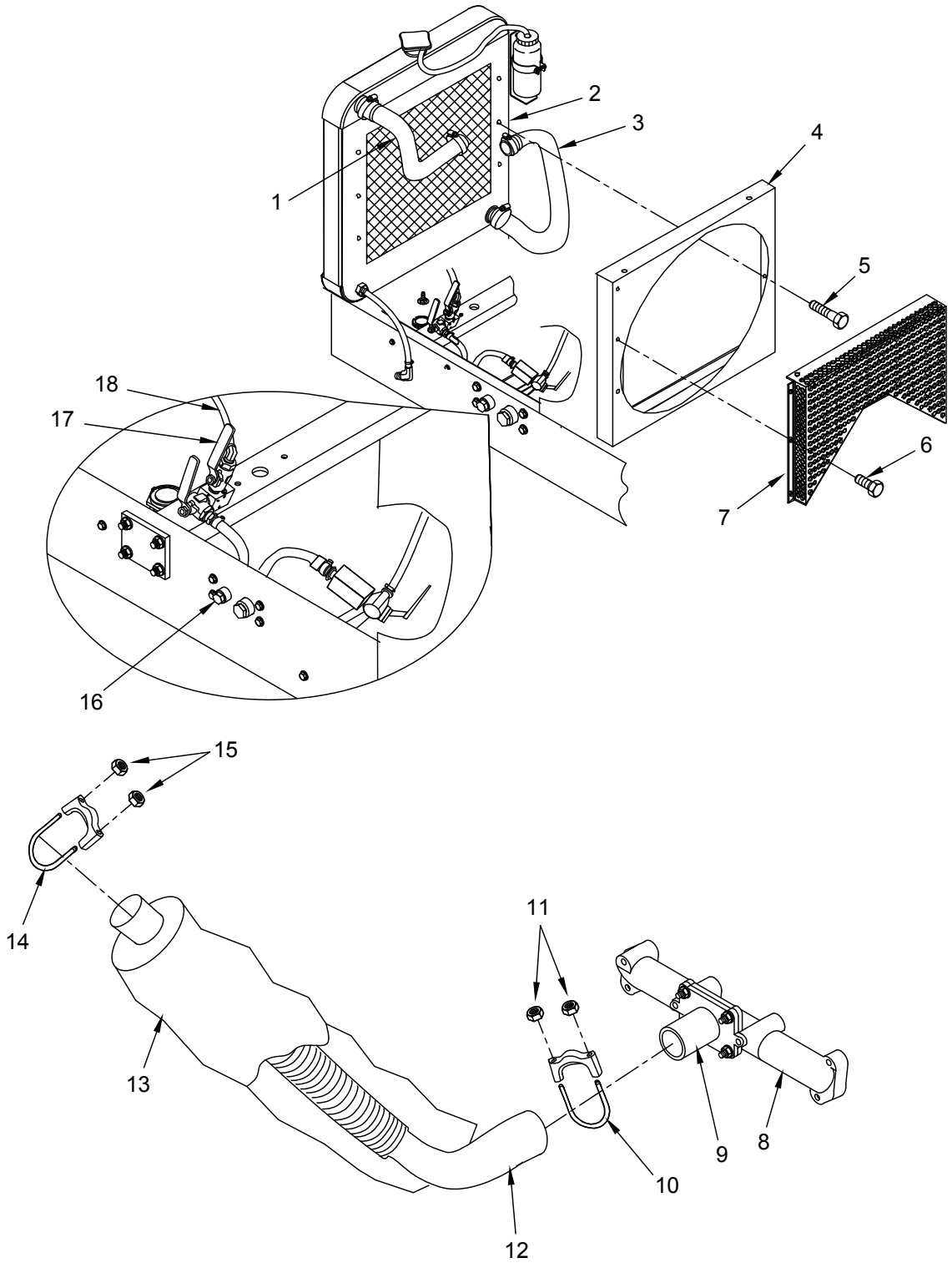


Figure 5. Radiator and Exhaust Manifold Connections Removal/Replacement.

END OF TASK

Removing Engine (Hydronic) Heater Connections

WARNING

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

Collect fluids in appropriate chemical-resistant containers. If disposing of fluids, dispose of properly through local servicing Defense Reutilization and Marketing Office.

Prior to performing the following steps, place absorbent towels under hoses and lines being removed.

1. Loosen hose clamp on Genset hydronic heater fuel line (Figure 6, Item 7) at the hydronic heater and disconnect fuel line. Place fuel line into spill bucket. If necessary, refer to procedure in (WP 0064) of this TM.

2. Disconnect power connection (Figure 6, Item 6) from hydronic heater fuel pump (Figure 6, Item 10). Follow wiring and remove any strap ties/cable clamps securing wiring.

3. Remove and retain bolt (Figure 6, Item 8) and washer (Figure 6, Item 9) that secures hydronic heater fuel pump (Figure 6, Item 10) and ground cable (Figure 6, Item 11) to I-beam (Figure 6, Item 1).

4. Remove and retain bolt (Figure 6, Item 2) and washer (Figure 6, Item 3) that secures hydronic heater exhaust line clamp (Figure 6, Item 5) to I-beam (Figure 6, Item 1).

END OF TASK

Removing Battery Warming Plate Connections

WARNING

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

Collect fluids in appropriate chemical-resistant containers. If disposing of fluids, dispose of properly through local servicing Defense Reutilization and Marketing Office.

Prior to performing the following steps, place absorbent towels under hoses and lines being removed.

1. Disconnect input and output hoses (Figure 6, Items 12) from battery warming plate (Figure 6, Item 13). Place input and output hoses (Figure 6, Items 12) into spill bucket. If necessary, refer to procedure in (WP 0041) of this TM.

2. Follow input and output hoses (Figure 6, Items 12) around engine and remove any strap ties/cable clamps securing hoses.

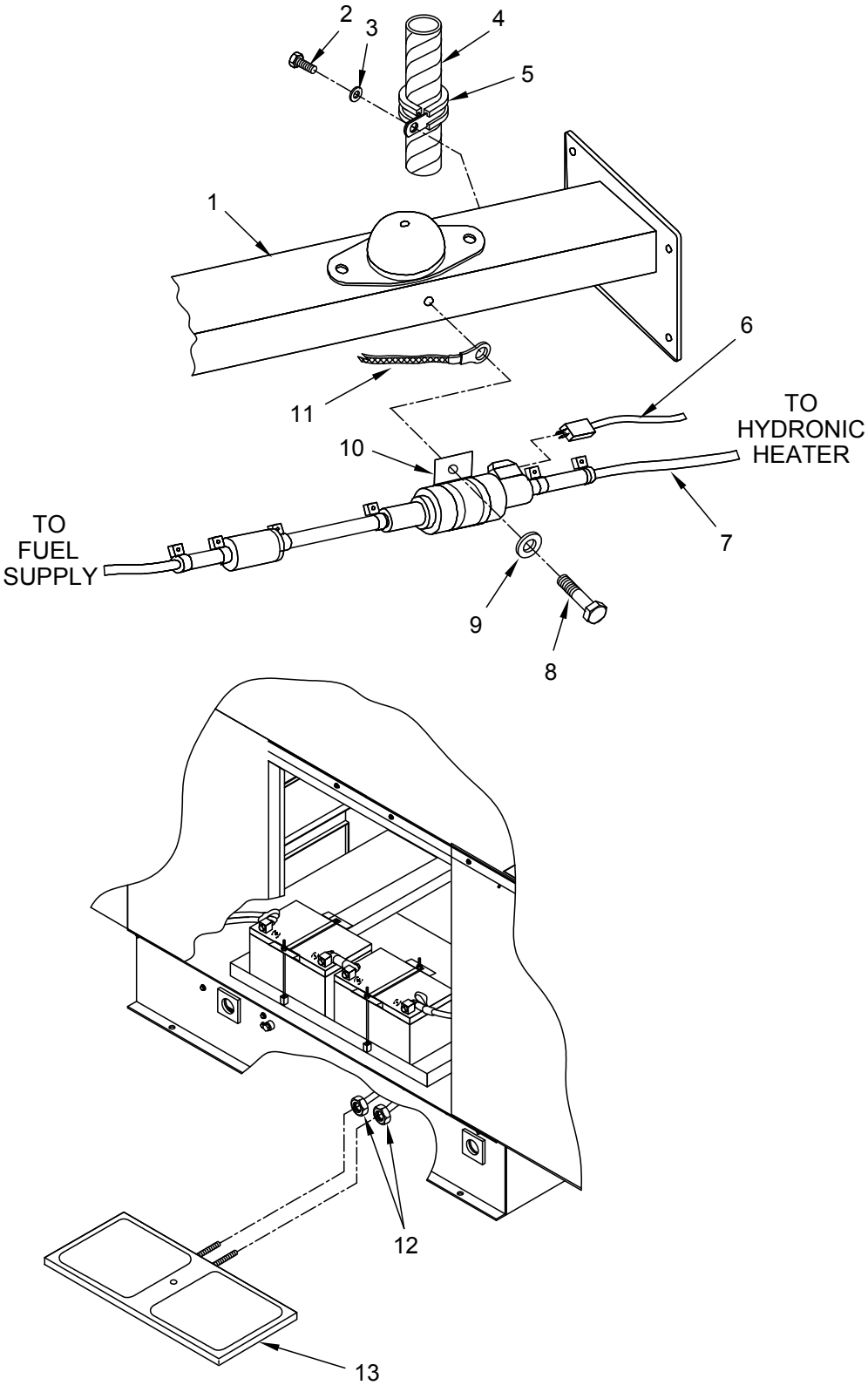


Figure 6. Engine (hydronic) Heater and Battery Warming Plate Connections Removal/Replacement.

END OF TASK

Removing EGA

WARNING

The engine generator assembly (EGA) weighs 1020 lbs (462.66 kg). The engine weighs 680 lbs (308.44 kg) and the generator weighs 340 lbs (154.22 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the engine or generator without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Prior to performing any maintenance that requires climbing on or under trailer, ensure wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Once the EGA is removed, do not allow unit to hang from lifting device. Failure to observe this warning can result in serious injury or death to personnel or damage to EGA.

To avoid possibility of counter balance to TMSS, ensure that tongue jack and jack assemblies are lowered to ground level to support trailer.

When performing the following step, ensure that chain/sling has two lift points. If all lift points are not utilized, EGA will be off balance causing EGA to tilt. Damage could occur to TMSS/EGA.

NOTE

One lift point (Figure 7, Item 7) is located on the engine and one lift point (Figure 7, Item 6) is located on the generator.

1. Attach chain/sling to two lift points (Figure 7, Items 6 and 7).
2. Remove and retain four mounting nuts (Figure 7, Item 1) and washers (Figure 7, Item 2) securing EGA (Figure 7, Item 3) to shock mounts (Figure 7, Item 4) on frame (Figure 7, Item 5).

NOTE

When performing the following step, ensure that area where EGA is to be placed is dry and level. Ensure that supports allow adequate room below EGA so that no Items on bottom become damaged.

3. If setting EGA on dirt, sand or other unstable ground, place supports (i.e., treated lumber) along ground for EGA (Figure 7, Item 3) to be placed on once removed from trailer.
4. Inspect around EGA. Ensure **ALL** cables, hoses, clamps, and other connections have been removed and EGA is free and clear of any obstructions or interference.

CAUTION

When performing the following step, guides should be observant of EGA to ensure no pieces from EGA get caught while lifting is in process. Be observant of radiator fins,

When performing the following step, guides should be observant of EGA to ensure supports are properly placed and that nothing on EGA gets damaged when placing onto supports.

5. Using a suitable lifting device, raise EGA (Figure 7, Item 3) off of trailer and place on supports. Once EGA (Figure 7, Item 3) is safely lowered, remove chain/sling from lift points.

END OF TASK

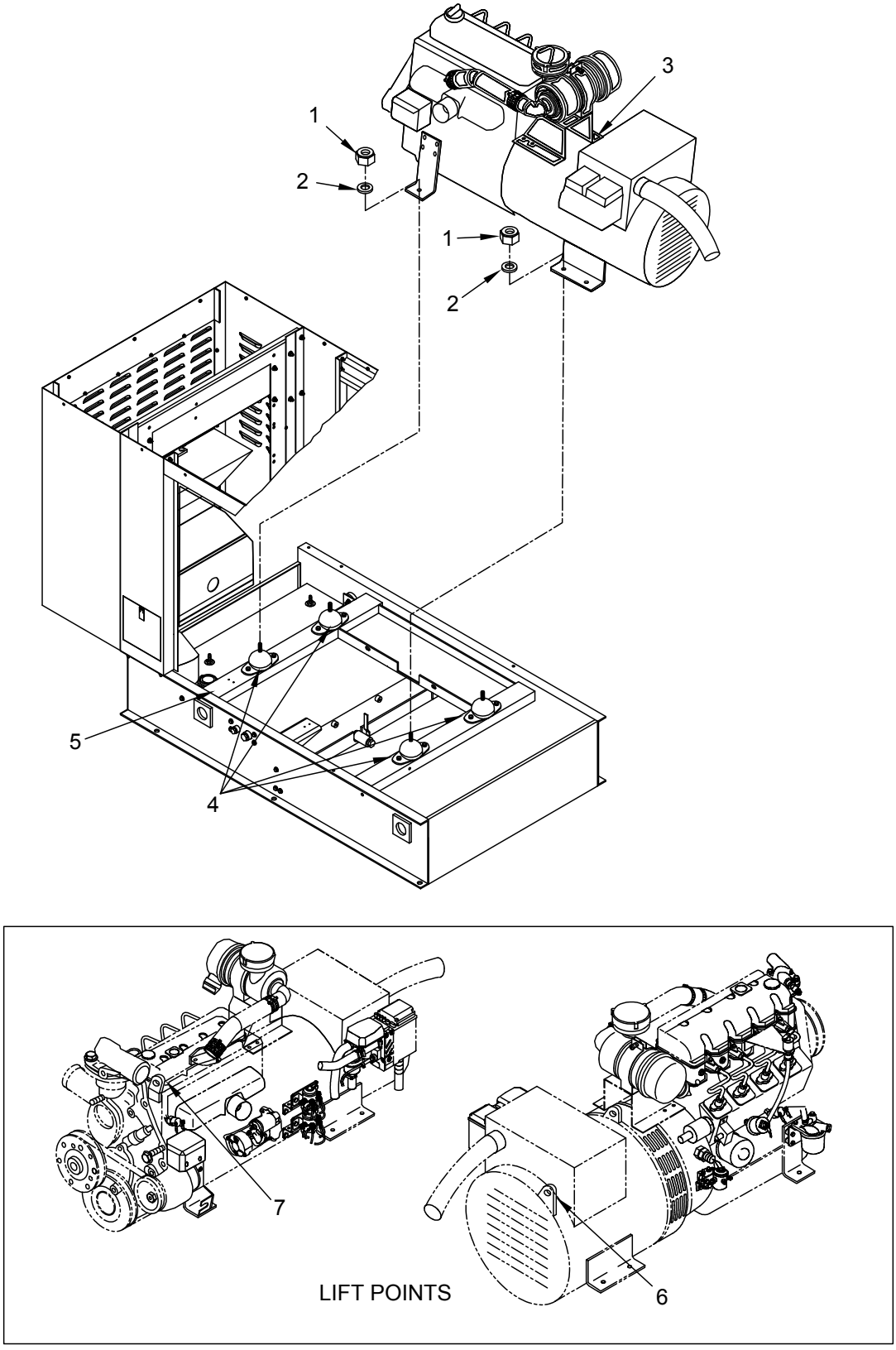


Figure 7. EGA Removal/Replacement.

END OF TASK

REPLACEMENT

Installing EGA

WARNING

The engine generator assembly (EGA) weighs 1020 lbs (462.66 kg). The engine weighs 680 lbs (308.44 kg) and the generator weighs 340 lbs (154.22 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the engine or generator without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Prior to performing any maintenance that requires climbing on or under trailer, ensure wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Once the EGA is raised do not allow unit to hang from lifting device. Failure to observe this warning can result in serious injury or death to personnel or damage to EGA.

1. Prior to installing the EGA:
   - Inspect all hoses and belts and ensure they are in good working order (i.e., no dry-rot, cracks, fraying, or other damage). If necessary, replace as described in the appropriate work package of this TM.
   - Inspect radiator and fuel tank. Ensure they are in good working order. If necessary, replace as described in the appropriate work package of this TM.
   - Inspect all shock mounts ensure they are in good working order (i.e., no dry-rot, cracks or other damage). If necessary, replace.
   - All electrical connections are in good working order (i.e., no fraying, loose connections, corrosion).
   - Ensure engine and generator are properly connected and all mounting hardware between engine and generator is secure.
2. Inspect inside of enclosure and area around EGA is free and clear of any obstructions or interference.
3. Attach chain/sling to the two lift points (Figure 7, Items 6 and 7).

CAUTION

When performing the following step, guides should be observant of EGA to ensure no pieces from EGA get caught while lifting is in process. Be observant of radiator fins.

4. Using a suitable lifting device, raise EGA (Figure 7, Item 3) up over enclosure and begin lowering.
5. Guide EGA (Figure 7, Item 3) onto shock mounts (Figure 7, Item 4) and secure using four mounting nuts (Figure 7, Item 1) and washers (Figure 7, Item 2).
6. Using torque wrench, tighten four mounting nuts (Figure 7, Item 1) to 51 ft./lb (69.15 n-m/7.05 kgf-m).
7. Once EGA (Figure 7, Item 3) is secured, remove chain/sling from lift points.

END OF TASK

Connecting Radiator

1. Install inner fan blade cover (Figure 5, Item 4) over water pump pulley.
2. Install fan blade onto water pump pulley. Refer to (WP 0067) of this TM for procedure and torque requirements.
3. Slide inner fan blade cover (Figure 5, Item 4) over fan blades and secure to radiator using six bolts (Figure 5, Item 5).
4. Ensure that fan belt is proper tension. Refer to (WP 0061) of this TM for procedure and torque requirements.
5. Install outer fan blade cover (Figure 5, Item 7) and secure using six bolts (Figure 5, Item 6).
6. Ensure overflow tube is secured to fan blade cover (Figure 5, Item 7) with strap ties.
7. Connect upper radiator hoses (Figure 5, Item 1) from radiator (Figure 5, Item 2) to water pump. Refer to procedure in (WP 0059) of this TM.
8. Connect lower radiator hose (Figure 5, Item 3) from engine to radiator (Figure 5, Item 2). Refer to procedure in (WP 0059) of this TM.
9. Connect engine drain line (Figure 5, Item 17) to COOLANT DRAIN plug connection (Figure 5, Item 15) on Genset.

END OF TASK

Connecting Exhaust

NOTE

If necessary, loosen thermal insulation (Figure 5, Item 13) around exhaust flex pipe (Figure 5, Item 12).

1. Install exhaust flex pipe (Figure 5, Item 12) onto elbow going to muffler. Secure using clamp/U-bolt (Figure 5, Item 14) and two nuts (Figure 5, Item 15).
2. Install exhaust flex pipe (Figure 5, Item 12) onto exhaust pipe “T” (Figure 5, Item 9) on exhaust manifold (Figure 5, Item 8). Secure using clamp/U-bolt (Figure 5, Item 10) and two nuts (Figure 5, Item 11).

END OF TASK

Connecting Engine (Hydronic) Heater Connections

1. Connect hydronic heater fuel line (Figure 6, Item 7) to hydronic heater and secure with hose clamp. If necessary, refer to (WP 0064) of this TM.
2. Secure hydronic heater exhaust line (Figure 6, Item 4) to I-beam (Figure 6, Item 1) with clamp (Figure 6, Item 5), bolt (Figure 6, Item 2) and washer (Figure 6, Item 3).
3. Connect power connection (Figure 6, Item 6) to hydronic heater fuel pump (Figure 6, Item 10). Follow wiring and secure with strap ties/cable clamps as required.

Connecting Engine (Hydronic) Heater Connections - Continued

4. Secure hydronic heater fuel pump (Figure 6, Item 10) and ground cable (Figure 6, Item 11) to I-beam (Figure 6, Item 1) with bolt (Figure 6, Item 8) and washer (Figure 6, Item 9).

END OF TASK

Connecting Battery Warming Plate

NOTE

Prior to connecting input and output hoses wrap threads with Teflon tape.

1. Connect input and output hoses (Figure 6, Items 12) to battery warming plate (Figure 6, Item 13) and tighten. If necessary, refer to (WP 0041) of this TM.

2. Follow input and output hoses (Figure 6, Items 12) around engine and secure with strap ties/cable clamps.

END OF TASK

Connecting Oil Line

NOTE

Prior to connecting drain line wrap threads with Teflon tape.

1. Connect drain line (Figure 4, Item 1) to bottom of oil pan (Figure 4, Item 3) and tighten.

2. Ensure valve to LUBE OIL plug (Figure 4, Item 10) is closed.

END OF TASK

Connecting Fuel Lines

1. If necessary, move fuel line heater below I-beam out of the way.

2. Connect the inlet fuel line (Figure 4, Item 4) running from fuel line heater (Figure 4, Item 9) to the fuel filter.

3. Connect the engine return fuel line (Figure 4, Item 2) to the fuel injector rail. If necessary, refer to (WP 0048) of this TM. Install any strap ties needed to secure engine return fuel line.

NOTE

Refer to (Table 2)or (Figure FO-9) for electrical schematic.

4. Pull back the protective cover (near K4 solenoid) from fuel line heater (Figure 4, Item 9) and secure fuel heater electrical connections. Insulate connections with electrical tape.

Table 2. Fuel line Heater Connections.

Fuel Line Heater Connections	Connector Identifier
1	402-K4S-3
2	407-EBGL

Connecting Fuel Lines - Continued

NOTE

When specific torque requirements are NOT stated in the procedures, refer to (WP 0067) for torque requirements.

5. Secure fuel line (Figure 4, Item 8) to engine with bracket (Figure 4, Item 5), two mounting bolts (Figure 4, Item 7), and two flat washers (Figure 4, Item 6).

END OF TASK

Electrical Connections

1. Connect ground cable to GROUND on frame of Genset.
2. Connect ground cable (black) (Figure 3, Item 12) to engine block with mounting bolt (Figure 3, Item 16).
3. Route ground cable (black) (Figure 3, Item 12) around engine and place near negative(–) battery terminal. Secure ground cable (black) (Figure 3, Item 12) with any cable clamps removed during disassembly. If necessary, refer to procedure in (WP 0041) of this TM.
4. Verify that shroud (Figure 3, Item 21) has been installed onto generator and secured using four bolts (Figure 3, Item 22).
5. Insert conduit (Figure 3, Item 1) from generator through barrier panel wall (Figure 3, Item 25) and secure using jam nut (Figure 3, Item 24).
6. Feed harness through barrier panel wall and connect CM1 to CF1 (on barrier panel side).
7. Remove and retain four nuts (Figure 3, Item 3) and lock washers (Figure 3, Item 4) from terminals of generator.

NOTE

If necessary, refer to (Table 3) or (Figure FO-9) for electrical schematic.

8. Connect four wires (Figure 3, Item 2) (red, white, blue, and black) to generator and secure using four nuts (Figure 3, Item 3) and lock washers (Figure 3, Item 4).
9. Remove and retain screw (Figure 3, Item 5) from generator. Connect ground wire (green) (Figure 3, Item 6) and secure using screw (Figure 3, Item 5).
10. Feed all five wires (Figure 3, Item 2) (red, white, blue, black and green) through conduit (Figure 3, Item 1) to barrier panel side.
11. Connect three wires (Figure 3, Item 2) (red, blue, and black) to input side of circuit breaker CB5 on barrier panel.
12. Connect white wire to neutral terminal block (PTB2) on barrier panel.
13. Connect green wire to ground terminal block (GB) on barrier panel.
14. Install circuit breaker cover to Genset bottom control panel as described in (WP 0072).
15. Install power distribution panel as described in (WP 0074).

Electrical Connections - Continued

Table 3. Generator to Barrier Panel Connections.

Wire Color	Generator Connections	Barrier Panel Connections
Black	T7	248-CB5-2
Red	T8	249-CB5-4
Blue	T9	250-CB5-6
White	T4,T5,T6	247-PTB2-TP
Green	GGL (Generator junction box)	218-GB-13

16. Install generator cover (Figure 3, Item 7) and secure using four bolts (Figure 3, Item 8).

WARNING

DO NOT connect cables to battery terminals until instructed to do so. Premature connections will create a complete circuit and cause an unsafe working condition.

17. Connect battery cable (red) (Figure 3, Item 10) to starter (Figure 3, Item 17) and secure using bolt (Figure 3, Item 18) and washer (Figure 3, Item 19).

18. Route starter cable (red) (Figure 3, Item 10) around engine and place near positive battery terminal. Secure starter cable (red) (Figure 3, Item 10) with any cable clamps removed during disassembly.

19. Route hydronic heater cable (red) (Figure 3, Item 11) around engine and place near positive battery terminal. Secure hydronic heater cable (red) (Figure 3, Item 11) with any cable clamps removed during disassembly.

20. Route J6 cable (red) (Figure 3, Item 9) around engine and place near positive battery terminal. Secure J6 cable (red) (Figure 3, Item 9) with any cable clamps removed during disassembly.

21. Reconnect all battery cables to battery as described in (WP 0041) of this TM.

22. Connect fuse (Figure 3, Item 13) to battery terminals. If necessary, refer to (WP 0041) of this TM.

END OF TASK

Fluids

NOTE

Prior to performing the following steps:
- Ensure all fluid valves are closed.
- Inspect all hoses for cracks, swelling, or other obvious deterioration.
- Inspect all clamps verify that no damage or other obvious deterioration is present.

1. Fill fuel tank as described in (WP 0045).

NOTE

Refer to Expendable and Durable Items (WP 0168) for NSN and other information on oil and coolant.

2. Add 8.6 quarts (8.13 liters) of oil to engine as described in (WP 0042) of this TM.

3. Add proper coolant/water mix as necessary to bring the engine/radiator to proper level as described in (WP 0058) of this TM.

4. After all fluids have been added and are at their proper levels, inspect EGA for fluid leaks.

END OF TASK

Preparation for Operation

1. Install radiator access panel (Figure 2, Item 8) onto Genset (Figure 2, Item 7) secure using 16 bolts (Figure 2, Item 11), lock washers (Figure 2, Item 10) and flat washers (Figure 2, Item 9).

2. Install top access panel (Figure 2, Item 4) onto Genset (Figure 2, Item 7) and secure using 20 bolts (Figure 2, Item 12), lock washers (Figure 2, Item 13), and flat washers (Figure 2, Item 14).

3. Install exhaust pipe cap (Figure 2, Item 1) and tighten nut (Figure 2, Item 3) and bolt (Figure 2, Item 2).

4. Install all access doors (Figure 2, Items 5 and 6) onto Genset (Figure 2, Item 7).

5. Perform all necessary PMCS (refer to WP 0019 and WP 0037) on engine.

6. Prime engine as described in (WP 0048) and start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

7. Install cargo restraints (not shown).

END OF TASK

SEPARATING ENGINE GENERATOR ASSEMBLY – REMOVAL AND REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Standard Automotive Tool Set (WP 0165, Item 5)
Lifting Device (Hoist/Tow truck/Crane)
Chains/straps
Safety glasses/face shield

Materials/Parts
Cloth, cleaning (WP 0168, Item 14)
Rubber gloves (WP 0168, Item 24)
Strap ties (WP 0168, Items 55 to 57)

Personnel Required
Two

References
WP 0041, WP 0048, WP 0064
FO-6 through FO-12

Equipment Condition
Engine Generator Assembly removed from Genset enclosure

WARNING

The engine generator assembly (EGA) weighs 1020 lbs (462.66 kg). The engine weighs 680 lbs (308.44 kg) and the generator weighs 340 lbs (154.22 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the engine or generator without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Once the generator assembly is removed, do not allow unit to hang from lifting device or tilt forward main stator may slide out of position. Failure to observe this warning can result in serious injury or death to personnel or damage to internal parts of the generator.

REMOVAL

1. Remove EGA as described in this WP.
2. Remove any strap ties/cable clamps securing engine (hydronic) heater hoses and wiring harnesses around engine (hydronic) heater.
3. Remove engine (hydronic) heater (Figure 8, Item 21) from generator (Figure 8, Item 19). If necessary, refer to procedure in (WP 0064) of this TM.
4. Remove and retain four bolts (Figure 3, Item 22) securing shroud (Figure 3, Item 21) to generator (Figure 8, Item 19). Remove shroud (Figure 3, Item 21) and lay back.
5. Remove and retain bolt (Figure 8, Item 3), flat washers (Figure 8, Items 4, 5, and 6), lock washer (Figure 8, Item 7), and nut (Figure 8, Item 8) securing metal grille (Figure 8, Item 9).
6. Remove any strap ties/cable clamps securing hoses and wiring harnesses around metal grille (Figure 8, Item 9) of generator.
7. Remove and retain metal grille (Figure 8, Item 9).
8. Remove and retain eight bolts (Figure 8, Item 16) and lock washers (Figure 8, Item 15) from flex plate (Figure 8, Item 12).
9. Attach chain/sling to the two lift points on the engine. Remove any slack from chain/sling and support engine.

REMOVAL - Continued

10. Remove and retain six mounting bolts (Figure 8, Item 14) securing the generator (Figure 8, Item 19) to the engine (Figure 8, Item 1).

11. Remove two nuts (Figure 8, Item 17) securing the generator (Figure 8, Item 19) to the two alignment studs (Figure 8, Item 18).

CAUTION

When performing the following step, ensure that flex plate (Figure 8, Item 12) on generator and engine flywheel do not stick together causing main stator to slide out of generator. Failure to observe this caution can result in serious damage to the generator.

Prior to beginning the following steps, ensure that engine and generator are supported separately using a bottle jack (Figure 8, Item 10) or lumber support (Figure 8, Items 2 and 11). Failure to observe this caution can result in serious damage to engine or generator.

12. Pry generator (Figure 8, Item 19) away from the engine (Figure 8, Item 1).

WARNING

The generator weighs 340 lbs (154.22 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the engine or generator without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

CAUTION

When performing the following step, ensure that generator does NOT lean forward; the main stator may slide out of position. Failure to observe this caution can result in serious damage to the generator.

13. Using a suitable lifting device, slightly raise generator (Figure 8, Item 19) and slide away from the engine (Figure 8, Item 1). Ensure generator is tilted back slightly to keep stator from falling out.

14. Using, strap ties, secure flex plate (Figure 8, Item 9) to frame of generator (Figure 8, Item 19).

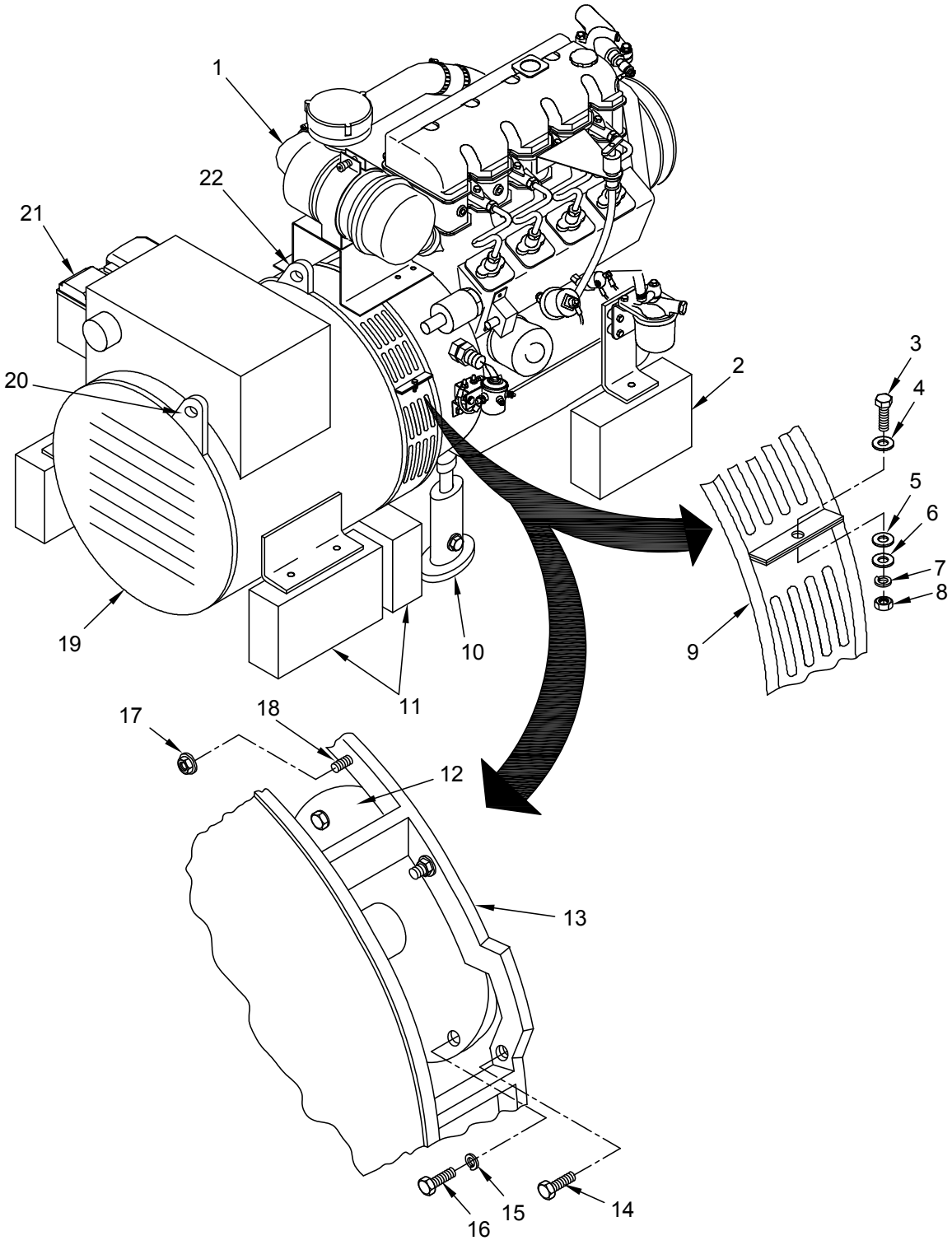


Figure 8. Separating Engine Generator Assembly.

END OF TASK

REPLACEMENT

WARNING

The generator weighs 340 lbs (154.22 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the engine or generator without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

CAUTION

Prior to beginning the following steps, ensure that engine and generator are supported separately using a bottle jack (Figure 8, Item 10) or lumber support (Figure 8, Items 2 and 11). Failure to observe this caution can result in serious damage to the engine or generator.

1. Attach suitable lifting device to the two lift points (Figure 8, Items 20 and 22) on the generator (Figure 8, Item 19). Remove any slack from chain/sling.

2. Remove any strap-ties securing flex plate (Figure 8, Item 12) to frame of generator (Figure 8, Item 19).

CAUTION

When performing the following step, ensure that generator does NOT lean forward; the main stator may slide out of position. Failure to observe this caution can result in serious damage to the generator.

3. Using a suitable lifting device, lift generator (Figure 8, Item 19) and guide onto two alignment studs (Figure 8, Item 18) on engine (Figure 8, Item 1). Ensure generator is tilted back slightly to keep stator from falling out.

2. Loosely install two nuts (Figure 8, Item 17) onto two alignment studs (Figure 8, Item 18) on engine (Figure 8, Item 1).

3. Loosely install six mounting bolts (Figure 8, Item 14) and secure generator (Figure 8, Item 19) to engine (Figure 8, Item 1).

4. Align flex plate (Figure 8, Item 12) with engine (Figure 8, Item 1). Loosely install eight bolts (Figure 8, Item 16) and lock washers (Figure 8, Item 15).

5. Using torque wrench, tighten two nuts (Figure 8, Item 17) on alignment studs (Figure 8, Item 18) to 35 to 40 ft./lb (47.45~54.23 n-m/4.84~5.53 kgf-m).

6. Using torque wrench, tighten six mounting bolts (Figure 8, Item 11) to 35 to 40 ft./lb (47.45~54.23 n-m/4.84~5.53 kgf-m).

7. Using torque wrench, tighten eight bolts (Figure 8, Item 16) and lock washers (Figure 8, Item 15) on flex plate (Figure 8, Item 12) to 17 to 20 ft./lb (23.05~27.11 n-m/2.35~2.76 kgf-m).

8. Install metal grille (Figure 8, Item 9) onto generator (Figure 8, Item 19) and secure with bolt (Figure 8, Item 3), flat washers (Figure 8, Items 4, 5, and 6), lock washer (Figure 8, Item 7), and nut (Figure 8, Item 8). Using torque wrench, tighten bolt (Figure 8, Item 3) to 7 to 10 ft./lb (9.49~13.55 n-m/0.97~1.38 kgf-m).

9. Install shroud (Figure 3, Item 21) onto generator (Figure 8, Item 19). Secure using four bolts (Figure 3, Item 22).

10. Install engine (hydronic) heater (Figure 8, Item 21) to generator (Figure 8, Item 19). If necessary, refer to procedure in (WP 0064) of this TM.

REPLACEMENT – Continued

11. Secure engine (hydronic) heater hoses and wiring harnesses using strap ties and/or cable clamps.
12. Install EGA as described in this WP.

END OF TASK

END OF WORK PACKAGE

CHAPTER 7

MAINTAINER MAINTENANCE INSTRUCTIONS FOR TMSS-MED ECU

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
SERVICE UPON RECEIPT – ECU

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

Personnel Required
Two to four

References
WP 0005, WP 0019, WP 0089, WP 0090 – WP 0114

GENERAL

The following procedures are required to be performed by Maintainer level maintenance in order to prepare the TMSS-MED ECU for use.

SITING

For minimal problems with set-up and operation of TMSS-MED ECU and equipment being used insure area is:

- Dry.
- Level with adequate room for trailer, shelter, system grounding, and all other associated equipment.
- Free of items (trees, buildings, or other structures) that would impede set-up of TMSS-MED or cause physical interference for trailer, shelter, system grounding, and all other associated equipment.
- Free of items (e.g., towers, power lines, radar, trees, buildings) that would cause interference with electronic equipment being used inside of shelter.

ECU REQUIREMENTS

The TMSS-MED ECU requires 208 VAC, 60 Hz, 3Ø input for operation. The ECU is designed to be operated mounted on the TMSS-MED trailer. It may operate as a stand-alone unit. However, if operated as a stand-alone unit, the TMSS-MED ECU must be elevated off the ground to avoid damage to hoses and components which extend below the ECU. This requires two pieces of 48 in. (1.21 m) 6x6 (15.24 cm x 15.24 cm) timber.

SERVICE UPON RECEIPT

Inspect the ECU and its components for damage incurred during shipment. If any damage is visible, notify supervisor. Report the damage on DD Form 361, Transportation Discrepancy Report. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with applicable service instructions.

Once all covers are removed, inspect the trailer, shelter, and each piece of equipment for damage incurred during shipment. Inspect all loose pieces of equipment located in the trailer cargo box.

INSTALLATION INSTRUCTIONS

The TMSS-MED ECU requires some assembly depending on the mode of operation. To setup the TMSS-MED ECU in a fixed mode of operation, refer to Operation Under Usual Conditions (WP 0005) for setup and power-up procedures.

PRELIMINARY SERVICING OF ECU

WARNING

When working on the TMSS-MED, do not operate electric equipment if floors, ceiling or walls of the individual enclosure show evidence of water intrusion. Electrical shock can cause personnel injury or death.

Do not apply power if grounding is not connected. Electrical shock can cause personnel injury or death.

The TMSS-MED ECU contains R-407c refrigerant. Care must be taken when purging, charging, vacuuming, leak checking. Maintainer PMCS for the TMSS-MED ECU is in (WP 0089). For Maintainer level removal and replacement procedures of components and assemblies of the TMSS-MED ECU, refer to (WP 0090 through WP 0114).

Once the TMSS-MED ECU has been placed into operation, the following maintenance should be performed after the first 50 hours of operation.

- Check air filters
- Check hydronic heater fuel filter
- Check tension on belts
- Check refrigerant level
- Check fluid level of hydronic heater
- Check lines for leaks

PRELIMINARY CHECK AND ADJUSTMENTS OF EQUIPMENT

Before placing the TMSS-MED ECU into service, ensure that all Crew PMCS (WP 0019) and Maintainer PMCS (WP 0089) have been performed.

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
PMCS INTRODUCTION – ECU

GENERAL

This work package provides data necessary to keep the TMSS-MED ECU operational ready. PMCS are performed to keep the TMSS-MED ECU in operational condition. The checks are used to find, correct, and report problems. Maintenance personnel are required to perform the tasks as indicated in Maintainer PMCS (WP 0089, Table 1). PMCS are performed by the Maintainer each time the equipment is operated. Prior to performing any maintenance that requires climbing on or under TMSS-MED, ensure cage bolts are not inserted and wheels are chocked. Injury to personnel could result from TMSS-MED suddenly rolling or tipping.

Before you begin operating the TMSS-MED ECU and/or its equipment, do Before PMCS.

Once a week do Weekly PMCS. If TMSS-MED ECU has not been operated in a week, perform Before PMCS.

Do Monthly PMCS once a month. If TMSS-MED trailer has not been operated in a month, perform PMCS as outlined in (WP 0089).

If you are operating the TMSS-MED ECU for the first time, perform Weekly and Monthly PMCS the first time you do your Before PMCS.

If you find something wrong when performing PMCS, fix it if you can. Otherwise, notify your supervisor.

WARNINGS AND CAUTIONS

Special attention should be paid to the WARNINGS and CAUTIONS appearing in the Maintainer PMCS table. A WARNING means someone could be injured. A CAUTION means equipment could be damaged.

LEAKAGE DEFINITION

It is necessary for you to know how fluid leakage affects the status of the trailer. The following are definitions of the classes of leakage you need to know to be able to determine the status of the trailer. Learn these leakage definitions when in doubt, contact your supervisor.

CAUTION

Maintainers must perform appropriate maintenance when Operators report Class III leaks. Failure to comply may result in damage to equipment.

NOTE

The following note applies to non-flammable liquids only. Any leakage of flammable liquid is unacceptable.

Equipment operation is allowable with minor leakages (Class I or II). Consideration must be given to fluid capacity of the item or system being checked. When Maintainer is in doubt, notify your supervisor.

When operating with Class I or II leaks, continue to check fluid levels as required in your PMCS.

LEAKAGE DEFINITION – Continued

CLASS I - Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

CLASS II - Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked.

CLASS III - Leakage of fluid great enough to form drops that fall from the item being checked.

INSPECTION

Look for signs of a problem or trouble. Senses help here. You can feel, smell, hear, or see many problems. Be alert when on the TMSS-MED ECU.

Inspect to see if components are in good condition. Are they correctly assembled, stowed, and secured, or excessively worn, leaking, corroded, or damaged? Correct any problems found or notify your supervisor.

There are some common items to check all over the TMSS-MED ECU. These include the following:

1. Bolts, clamps, nuts, and screws: Continuously check for looseness. Look for chipped paint, rust, or corrosion around bolt and screw heads and nuts. Tighten them when you find them loose. If tools are not available, notify your supervisor.

2. Welds: Many items on the TMSS-MED ECU are welded. To check these welds, look for chipped paint, rust corrosion, or gaps. When these conditions exist, Maintainer must notify their supervisor.

3. Electrical wires, connectors, and harnesses: Tighten loose connectors. Look for cracked or broken insulation, bare wires, and broken connectors. If any damage is found, Maintainer must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify their supervisor.

4. Hoses and fluid lines: Look for wear, damage and leaks, and make sure clamps and fittings are tight. Wet spots mean a leak. A stain by a fitting or connector can also mean a leak. If any leaks or damage is found, Maintainer must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify their supervisor.

5.Belts and pulleys. Check belt tension. Look for cracks, excessive wear and damage. Check pulleys for rust corrosion, or damage. If any damage is found, Maintainer Level Maintenance must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify their supervisor.

LUBRICATION MAINTAINER INTERVALS - NORMAL CONDITIONS

General

For safer, more trouble-free operations, make sure that your TMSS-MED ECU is serviced when it needs it. Proper maintenance intervals which are the responsibility of the Maintainer level maintenance are found in this chapter.

Adherence

Intervals (on-condition or hard time) and the related man-hour times are based on normal operation. The man-hour time specified is the time needed to do all the maintenance prescribed for a particular interval. On-condition (OC) oil sample intervals shall be applied. Change the hard time interval if lubricants are contaminated or if operating the equipment under adverse operating conditions, included longer-than-usual operating hours. The calendar interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard time intervals must be applied during the warranty period.

Cleaning Fittings Before Lubrication

WARNING

Cleaning solvents may be toxic and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breath vapors. Keep away from heat or flame. Never smoke when using cleaning solvent. Failure to comply may result in serious injury or death to personnel.

If personnel become dizzy while using cleaning solvents, immediately get fresh air and medical help. If cleaning solvent contacts skin or clothes, flush with cold water. If cleaning solvent contacts eyes, immediately flush eyes with water and get medical attention. Failure to comply may result in serious injury or death to personnel.

Clean parts with cleaning solvent. Dry before lubricating.

Lubrication After Fording

If a fording operation occurs, lubricate all fittings below fording depth and check submerged gear boxes for presence of water.

Lubrication After High Pressure Washing

After a thorough washing, lubricate all grease fittings and oil can points outside and underneath trailer.

Corrosion Control

Refer to Corrosion Prevention and Control (CPC), (WP 0001), for appropriate corrosion control procedures.

Hard Time Lubrication Intervals

For equipment under manufacturer's warranty, hard time lubrication intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (e.g. longer than usual operating hours, extended idling periods, extreme dust).

EXPLANATION OF TABLE ENTRIES

Item Number - Numbers in this column are for reference. When completing DA Form 2404/DA Form 5988E (Equipment Inspection and Maintenance Worksheet), include the item number for the check/service indicating a fault. Item numbers appear in the order in which the checks/services are performed for the interval listed.

Interval - This column indicates when a procedure must be performed (i.e., Before, During, or After an operation.)

Item to Be Checked or Serviced - This column provides the item that is to be checked or serviced.

Procedure - This column describes the procedure that must be followed to ensure that the equipment is capable of performing its intended mission.

Equipment Not Ready/Available If - This column lists conditions that make the TMSS-MED not fully mission capable. If the problem can be fixed using the troubleshooting procedures and/or maintenance procedures in this manual, do so. If not, document the items not able to be fixed on DA Form 2404 for the next level of maintenance. For further information on how to use this form, see DA PAM 750-8. Be sure to observe and annotate all special circumstances that appear/occur.

EXPLANATION OF TABLE ENTRIES - Continued

Other Entries - Be sure to observe and annotate all special circumstances that appear/occur.

NOTE

If the equipment must be kept in continuous operation, only perform those procedures that will not disturb operation. Complete checks and services when the equipment is shut down.

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
PMCS (ECU)

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

References
WP 0091 – WP 0114

Personnel Required
Two

Table 1. Maintainer Preventive Maintenance Checks and Services – ECU.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1		**ECU**	**NOTE** Refer to (WP 0091 through WP 0114) for ECU maintenance procedures.	
	Weekly		1. Check damper assembly and sliding door. Verify that mechanism is operating properly. Repair or replace as necessary.	
			2. Check all components (i.e., switches, knobs, meter, lights, thermostat) for damage. Replace bulbs if necessary.	Damaged components, bulbs burnt out.
			3. Check condenser grill for damage. Replace if necessary.	
	50 Hours		Check blower motor fan belt. Check for excessive wear and proper tension. Replace if necessary.	
	125 Hours		1. Check air filters, verify that filters are clean and free of excessive dirt, grease, and grime. Clean or replace if necessary.	
			2. Check fuel filter, verify that filter is clean and free of excessive dirt and debris. Replace if necessary.	

Table 1. Maintainer Preventive Maintenance Checks and Services – ECU – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
	500 Hours		Perform overall inspection of TMSS-MED ECU.	
			1. Check all components for damage.	Missing or damaged components causing unsafe or improper operation of system.
			2. Check for completeness.	
	2,000 Hours		1. Replace fan belts (WP 0098)	
			2. Change ECU coolant.	

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU MAINTENANCE INDEX

GENERAL

This section contains an index of repair/removal/replacement or maintenance procedures that may be needed during maintenance or repair of the TMSS-MED ECU by Maintainer personnel. Maintenance is limited to those failures that may be repaired at the Maintainer level. The index identifies the maintenance function, which is followed by a column that identifies the work package and page(s) where Maintainer level procedure(s) may be found. The index is provided to assist in the quick location of a procedure. The manual cannot list all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

	Maintenance Function	Procedure
ENVIRONMENTAL CONTROL UNIT		
1.	Access panels catch removal/replacement	0091-2
2.	Condenser grill(s) removal/replacement	0092-2
3.	Condenser coil cleaning	0092-4
4.	Duct cover removal/replacement	0093-2
5.	Sliding door removal/replacement	0093-4
6.	Evaporator panel assembly removal/replacement	0093-6
7.	Damper assembly removal/replacement	0093-8
8.	Hydronic heater removal/replacement	0094-2
9.	Hydronic heater fuel pump and fuel filter removal/replacement	0094-5
10	Hydronic heater hose removal/replacement	0094-9
11.	Hydronic heater fuse removal/replacement	0094-11
12.	ECU high temperature cut-off switch removal/replacement	0095-2
13.	ECU high pressure cut-off switch removal/replacement	0095-4
14.	ECU Low Pressure Cut-Off Switch Removal/Replacement	0095-7
15.	ECU evaporator motor removal/replacement/adjustment	0096-2
16.	ECU evaporator blower fan removal/replacement	0096-5
17.	ECU condenser fan motor removal/replacement	0097-2
18.	Evaporator motor belt tension adjustment	0098-2
19.	Evaporator motor belt removal/replacement	0098-4
20.	ECU – compressor removal/replacement	0099-2
21.	ECU – vibration damper removal/replacement	0099-6
22.	ECU – thermal expansion valve (TEV) removal/replacement	0100-2
23.	ECU – thermal expansion valve superheat adjustment	0100-5
24.	ECU – quench valve removal/replacement	0100-7
25.	ECU – hot gas bypass valve removal/replacement/adjustment	0100-10
26.	ECU – high pressure relief valve removal/replacement	0100-14
27.	ECU – solenoid valve removal/replacement	0100-17
28.	Air filter cleaning/removal/replacement	0101-2
29	ECU – filter/drier removal/replacement	0102-2
ECU CONTROL PANEL – (Door Components)		
30.	ECU control panel door – lights and meter removal/replacement	0103-2
31.	ECU control panel door – mode select switch removal/replacement	0103-4
32.	ECU control panel door – auxiliary heat switch test/removal/replacement	0103-6
33.	ECU control panel – thermostat test/removal/replacement	0103-8
34.	ECU control panel (door) components removal/replacement	0104-2

Maintenance Function		Procedure
ECU CONTROL PANEL – (Internal components)		
35.	ECU control panel contactors test/removal/replacement	0105-2
36.	ECU control panel relays removal/replacement	0106-2
37.	ECU control panel transformer removal/replacement	0107-2
38.	ECU control panel bridge rectifier removal/replacement	0107-4
39.	ECU control panel CMSP/EMSP removal/replacement	0108-2
ECU – Misc.		
40.	ECU removal/replacement	0109-2
41.	ECU – system purging	0110-3
42.	ECU – debrazing	0110-4
43.	ECU – brazing	0110-5
44.	ECU – leak testing	0111-2
45.	ECU – system evacuation	0112-2
46.	ECU – refigerant system recovery	0113-2
47.	ECU – refigerant system charging	0113-4
48.	ECU – subcool checking/adjusting	0114-2

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU ACCESS PANEL

GENERAL

This work package provides information on the removal and replacement of the ECU access panel catches.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the ECU.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

ACCESS PANEL CATCH REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

References
WP 0005

Materials/Parts
Catch, clamping

Equipment Condition
ECU shut down

Personnel Required
One

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

The following procedure is typical for all catches on the ECU and its access panels.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).

NOTE

When attempting to perform the following step, if panel will not become unlatched, DO NOT force the access panel. If necessary attempt to gain access to the damaged panel through the ECU. If this is necessary, make sure ECU is not in an operational status.

2. Remove the ECU access panel (Figure 1, Item 6) with the broken catch.
3. Remove and retain screw (Figure 1, Item 5) and back plate (Figure 1, Item 4) from rear of the catch (Figure 1, Item 1).
4. Remove catch (Figure 1, Item 1) from access panel (Figure 1, Item 6).

END OF TASK

REPLACEMENT

1. Insert new catch (Figure 1,Item 1) into access panel (Figure 1, Item 6).
2. Secure catch (Figure 1, Item 1) to access panel (Figure 1, Item 6) using screw (Figure 1, Item 5) and back plate (Figure 1, Item 4).

NOTE

The following step does not apply to all catch assemblies.

3. If necessary adjust screw (Figure 1, Item 2) and stop nut (Figure 1, Item 3) to proper level so catch (Figure 1, Item 1) operates properly.

REPLACEMENT – Continued

4. Reattach the repaired ECU access panel (Figure 1, Item 6).

5. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

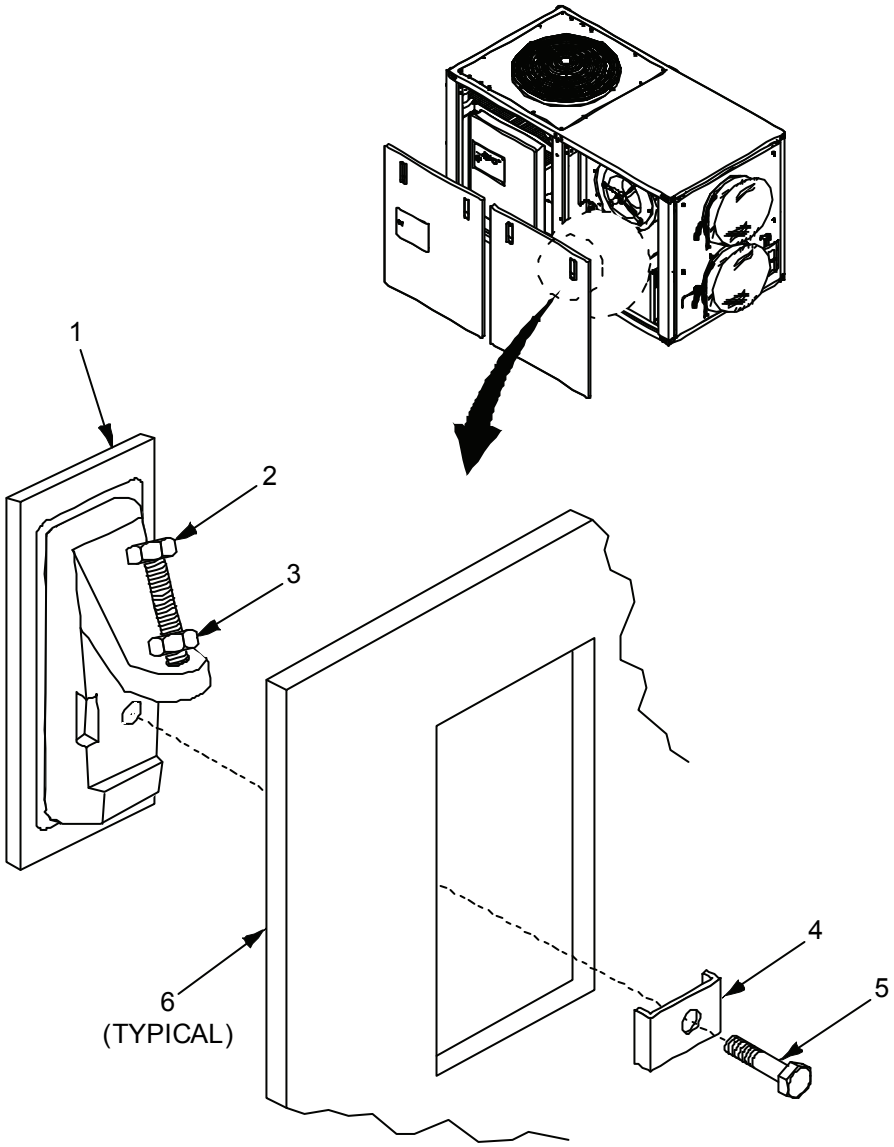


Figure 1. ECU Access Panel Catch Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU CONDENSER COIL AND GRILL

GENERAL

This work package provides information on the cleaning, removal and replacement of the ECU condenser grill. They consist of:

- Condenser grill removal/replacement.
- Condenser coil cleaning.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the ECU.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Sudden or irreversible tissue damage can result from freezing. Wear gloves and a face protector or safety glasses in any situation where skin or eye contact with refrigerant is possible.

Never attempt to perform maintenance when ECU is in operation. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with ECU operating.

Wear appropriate eye protection when performing maintenance. Metal pieces, fluids, dirt, grease, corrosion, and escaping vapors and gasses present. Failure to comply may result in injury to personnel.

Remove rings, bracelets, wrist watches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

Never attempt to connect or disconnect cables with ECU in operation. Always ensure ECU is shutdown before attempting to perform any of the following procedures.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

CONDENSER GRILL REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Spray bottle (WP 0168, Item 54)
Sealing compound
(WP 0168, Item 50)

Personnel Required
One

References
WP 0005

Equipment Condition
ECU shut down

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Remove and retain eight screws (Figure 1, Item 1) that secure ECU condenser grill (Figure 1, Item 2) to ECU.
3. Remove condenser grill (Figure 1, Item 2) and set aside.

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps, inspect condenser coils (Figure 1, Item 3). If necessary, perform cleaning procedure as described in this WP. If the condenser coils are damaged, contact your superior.

1. Coat eight screws (Figure 1, Item 1) with sealing compound.

NOTE

When performing the following step, ensure lattice is on outside of condenser grill (Figure 1, Item 2).

2. Position condenser grill (Figure 1, Item 2) on to ECU.
3. Secure condenser grill (Figure 1, Item 2) to ECU using eight screws (Figure 1, Item 1).

REPLACEMENT – Continued

4. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

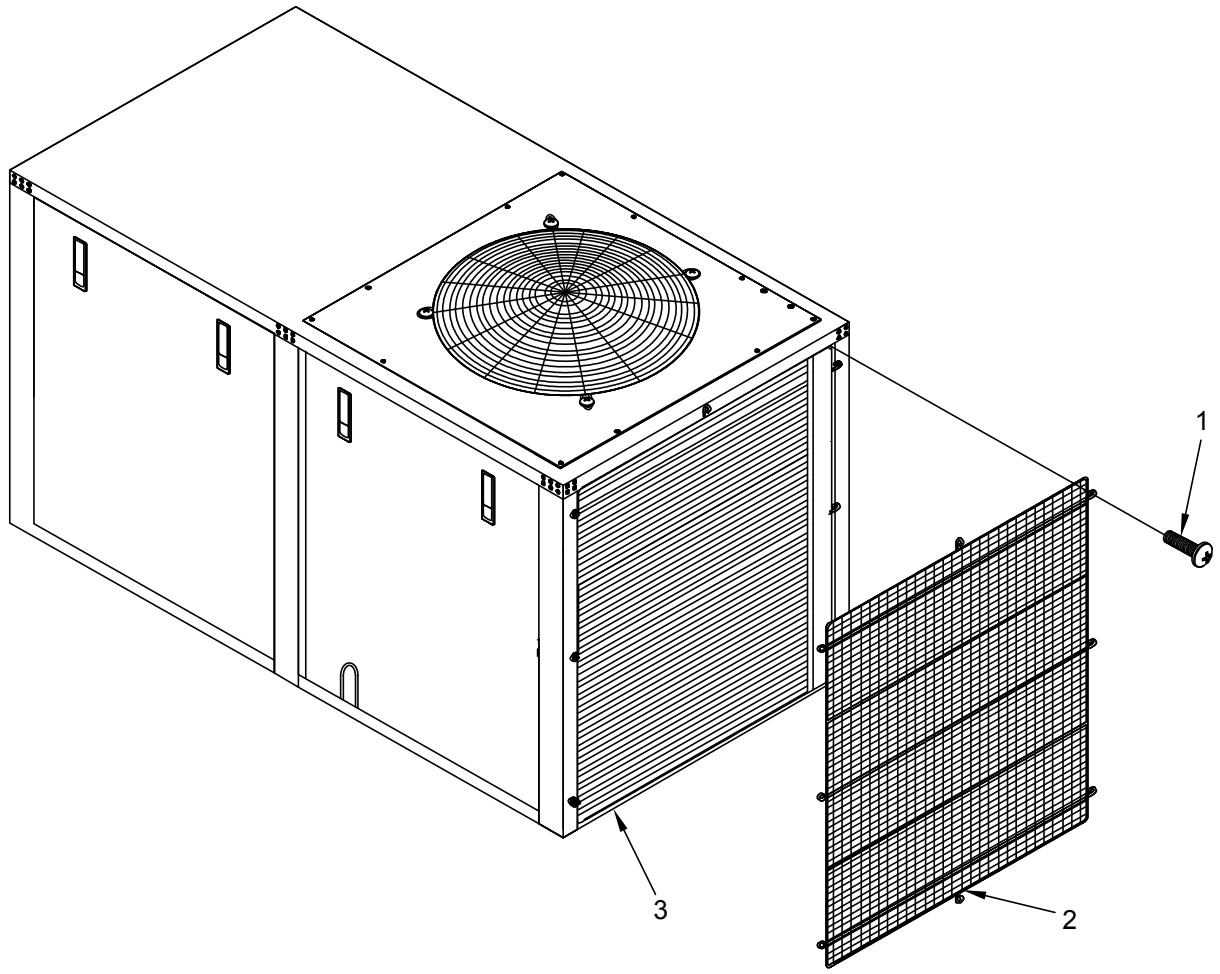


Figure 1. Condenser Grill Removal/Replacement.

END OF TASK

CONDENSER COIL CLEANING

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Spray bottle (WP 0168, Item 54)
Sealing compound
(WP 0168, Item 50)

Personnel Required
One

References
WP 0005

Equipment Condition
ECU shut down

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

CLEANING

1. Verify that ECU (Figure 2, Item 1) has been shut down in accordance with ECU Shut Down Procedure, (WP 0005).
2. Unlatch and remove rear access panel (Figure 2, Item 2) and forward access panel (Figure 2, Item 6) from ECU.
3. Remove and retain eight screws (Figure 2, Item 3) that secure ECU condenser coil grill (Figure 2, Item 4) to the ECU (Figure 2, Item 1).
4. Remove and retain condenser grill (Figure 2, Item 4) and set aside.

CAUTION

When performing the following step, be careful not to blow debris into chamber from outside.

When performing the following step, be cautious not to damage coil fins. Do not use compressed air for cleaning purposes unless it is less than 30 pounds per square inch gauge (30 psig) and then only with effective chip guarding and personnel protective equipment (industrial safety glasses or full face shield).

5. Using low pressure air, blow debris from the inside of condenser chamber (Figure 2, Item 7) outwards.
6. Using low pressure water (spray bottle is preferred), rinse debris from the inside of condenser chamber outwards.
7. If necessary, clean condenser coil (Figure 2, Item 5).
8. Allow inside of condenser chamber (Figure 2, Item 6) to dry completely before replacing rear access panel (Figure 2, Item 2) and forward access panel (Figure 2, Item 6) covers.

CLEANING – Continued

9. Coat eight screws (Figure 2, Item 3) with sealing compound.

10. Install ECU condenser grill (Figure 2, Item 4) and secure using eight screws (Figure 2, Item 3).

11. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

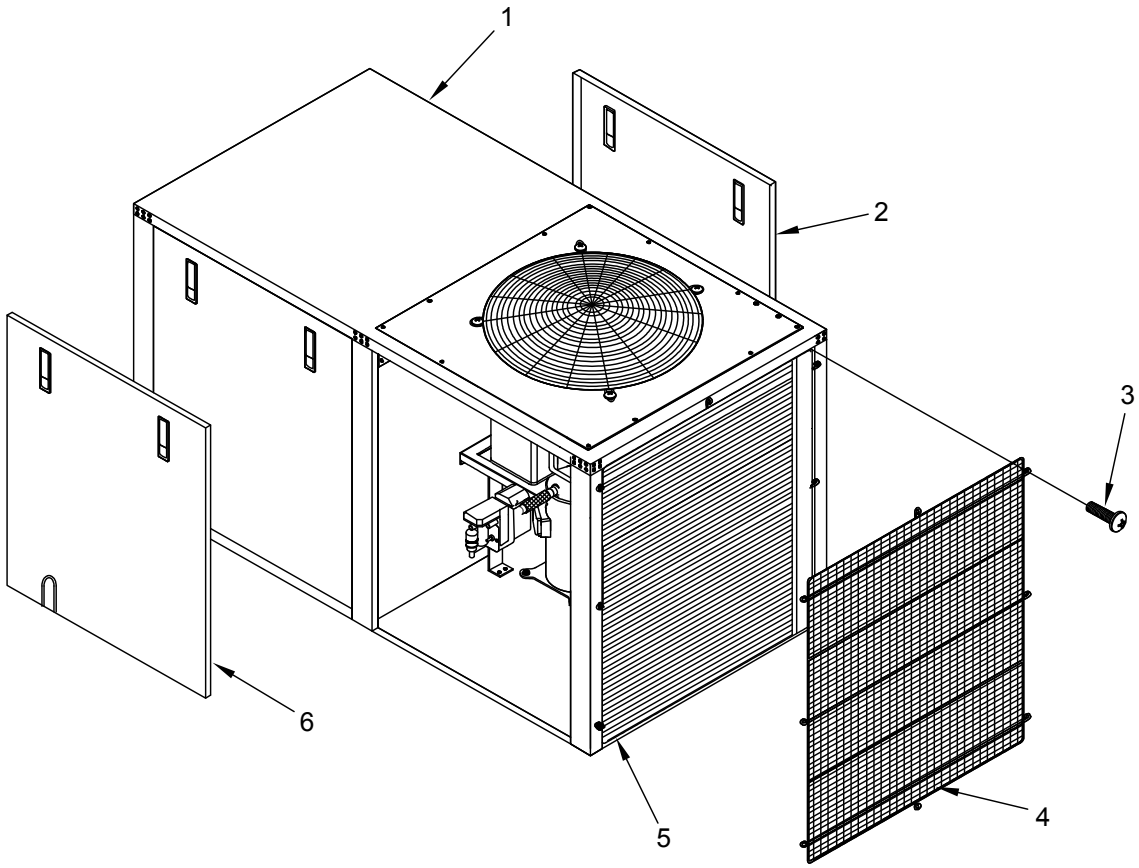


Figure 2. Condenser Coil Cleaning.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU DUCT COVER, SLIDING DOOR, EVAPORATOR PANEL, DAMPER

GENERAL

This work package provides information on the inspection, cleaning, adjustments, removal and replacement of the ECU duct cover, sliding door, evaporator panel, and damper assembly. They consist of:

- Duct cover removal/replacement
- Sliding door removal/replacement
- Evaporator panel assembly removal/replacement
- Damper assembly removal/replacement

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the ECU.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

DUCT COVER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0168, Item 1)

Materials/Parts
Duct cover

Personnel Required
One

References
WP 0005

Equipment Condition
ECU shut down

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. If necessary, remove supply and/or return duct assembly.
3. Remove screw (Figure 1, Item 2) and washer (Figure 1, Item 3) that secures lanyard (Figure 1, Item 4) of duct storage cover (Figure 1, Item 1) to the ECU evaporator assembly panel (Figure 1, Item 5).
4. If the duct cover (Figure 1, Item 1) is unserviceable, discard.

END OF TASK

REPLACEMENT

1. Slide the lanyard (Figure 1, Item 4) through hole in duct storage cover (Figure 1, Item 1).
2. Bend the nylon mounting strap over and insert male locking clasp into female locking clasp.
3. Press clasps together until locked.
4. Attach washer (Figure 1, Item 3) to mount screw (Figure 1, Item 2) and insert through loop in end of the lanyard (Figure 1, Item 4).
5. Insert screw (Figure 1, Item 2) into hole in ECU evaporator assembly panel (Figure 1, Item 5) and tighten down.
6. If necessary, reconnect supply and/or return duct assembly.
7. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

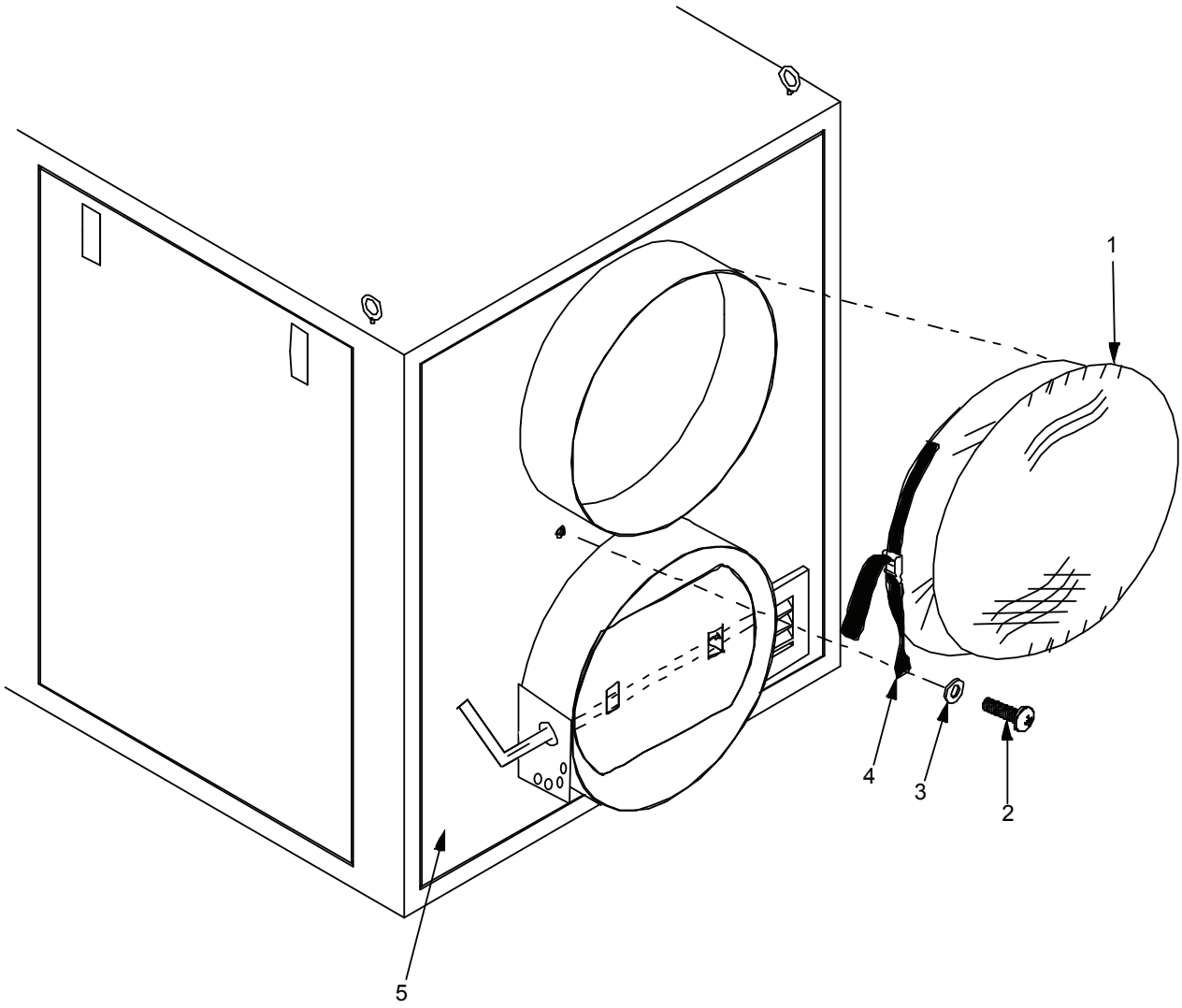


Figure 1. ECU Duct Cover Removal/Replacement.

END OF TASK

SLIDING DOOR REMOVAL/REPLACEMENT

INITIAL SETUP:

Materials/Parts
Door, sliding

References
WP 0005

Personnel Required
One

Equipment Condition
ECU shut down

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Remove sliding door (Figure 2, Item 1) by turning knob (Figure 2, Item 2) counter clockwise until loose.
3. Remove and retain knob (Figure 2, Item 2).
4. Remove sliding door (Figure 2, Item 1) out of housing (Figure 2, Item 3).

END OF TASK

REPLACEMENT

1. Insert sliding door (Figure 2, Item 1) down into the housing (Figure 2, Item 3).
2. Insert knob (Figure 2, Item 2) and turn clockwise to tighten.
3. Adjust the fresh air intake level by loosening knob (Figure 2, Item 2) and sliding fresh air intake gate (Figure 2, Item 1) to desired position. Tighten knob (Figure 2, Item 2).
4. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

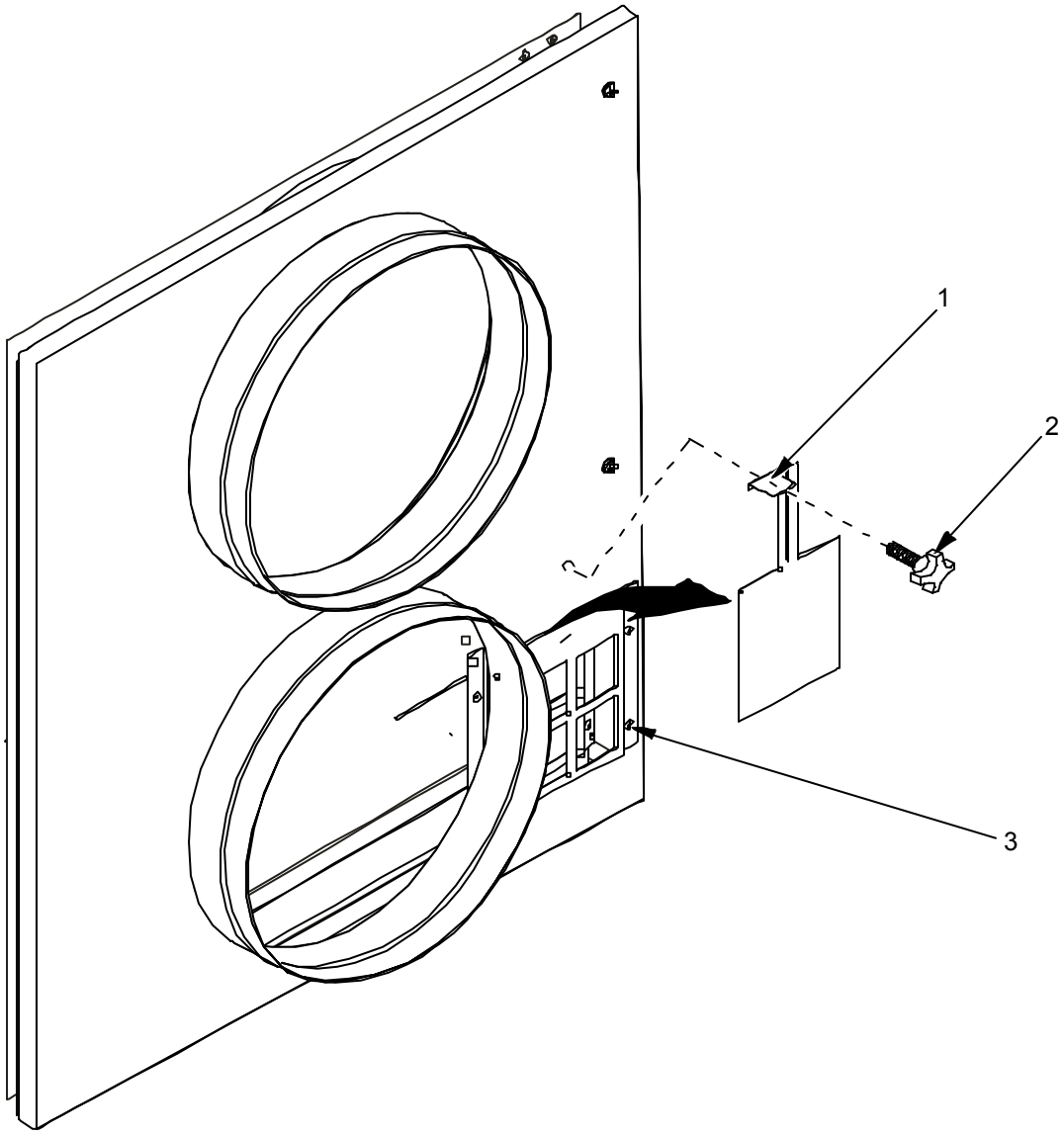


Figure 2. ECU Sliding Door Removal/Replacement.

END OF TASK

EVAPORATOR PANEL ASSEMBLY REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0168, Item 1)

References
WP 0005

Materials/Parts
Evaporator panel

Equipment Condition
ECU shut down

Personnel Required
One

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Disconnect the ECU power cable (Figure 3, Item 1) from the J1 connector on the Genset or from a shore power supply.
3. Remove supply and/or return duct assembly and set aside.
4. Remove sliding door (Figure 3, Item 5) from evaporator panel assembly (Figure 3, Item 4). (See procedure in this WP.)
5. Remove and retain six screws (Figure 3, Item 3) and washers (Figure 3, Item 2) that secure evaporator panel assembly (Figure 3, Item 4) to ECU.
6. Lift evaporator panel assembly (Figure 3, Item 4) up about one inch until the guide pins clear the center holes.
7. Place evaporator panel assembly (Figure 3, Item 4) out of immediate work area.

END OF TASK

REPLACEMENT

1. Lift evaporator panel assembly (Figure 3, Item 4) into position above the ECU enclosure opening.
2. Lower evaporator panel assembly (Figure 3, Item 4) so that the two guide pins drop into guide pin holes.
3. Push evaporator panel assembly (Figure 3, Item 4) forward until it is firmly against the ECU enclosure.
4. Secure evaporator panel assembly (Figure 3, Item 4) to ECU using six screws (Figure 3, Item 3) and washers (Figure 3, Item 2).
5. Install sliding door (Figure 3, Item 5) and secure to evaporator panel assembly (Figure 3, Item 4). (See procedure in this WP).
6. Install supply and/or return duct assembly or duct cover.
7. Verify that ECU power cable (Figure 3, Item 1) is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

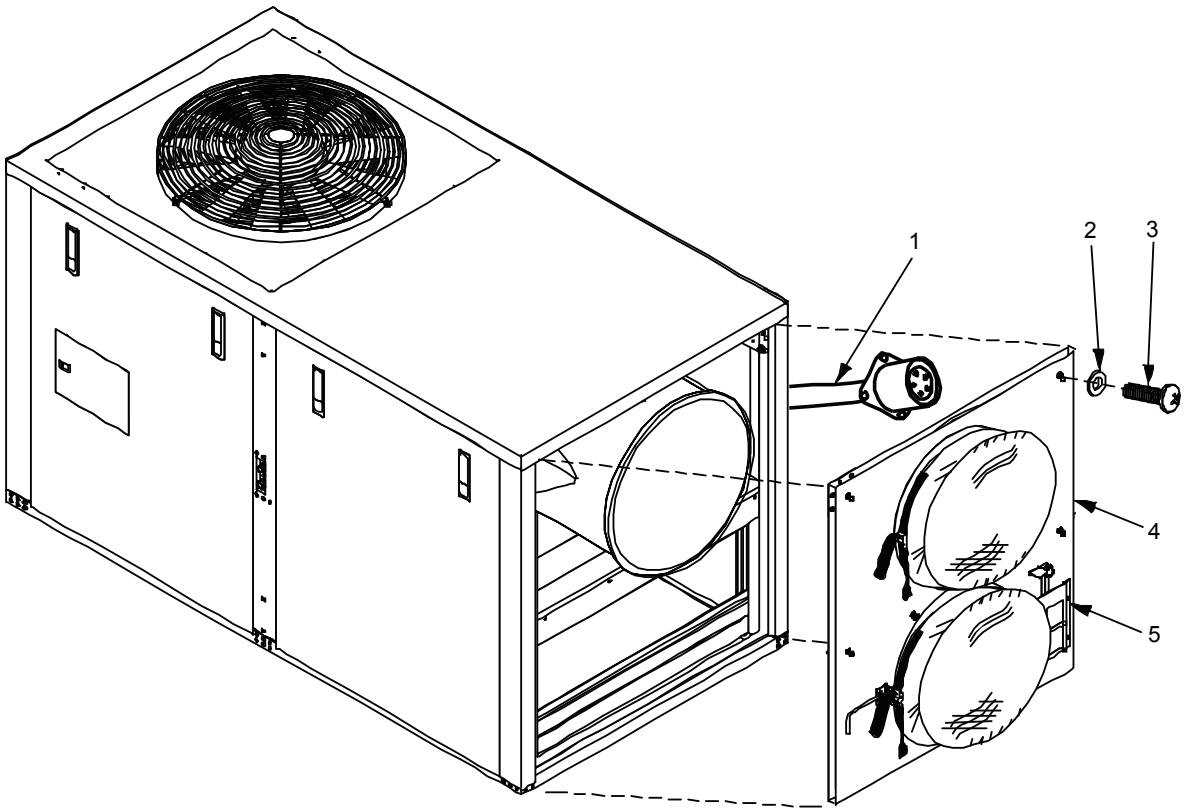


Figure 3. ECU Evaporator Panel Assembly Removal/Replacement.

END OF TASK

DAMPER ASSEMBLY REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0168, Item 1)

Materials/Parts
Damper plate

Personnel Required
One

References
WP 0005

Equipment Condition
ECU shut down

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. If necessary, remove supply and/or return duct assembly or duct cover.
3. Set damper rod (Figure 4, Item 1) to the open position.
4. Remove and retain screw (Figure 4, Item 2) and nut (Figure 4, Item 3) that secures damper plate (Figure 4, Item 4) to damper rod (Figure 4, Item 1).

NOTE

When performing the following step, be aware of the spring (Figure 4, Item 5) located on the damper rod (Figure 4, Item 1).

5. Slide damper rod (Figure 4, Item 1) out through damper plate (Figure 4, Item 4), spring (Figure 4, Item 5), lower duct work (Figure 4, Item 6) and duct wall clip (Figure 4, Item 7).
6. Properly discard of all damaged items.

END OF TASK

REPLACEMENT

1. Insert damper rod (Figure 4, Item 1) into duct wall clip (Figure 4, Item 7) and slide through lower duct work (Figure 4, Item 6) approximately three inches.
2. Place spring (Figure 4, Item 5) and damper plate (Figure 4, Item 4) onto damper rod (Figure 4, Item 1). Continue inserting assembly through lower duct work (Figure 4, Item 6).

REPLACEMENT – Continued

3. Ensure that damper rod (Figure 4, Item 1) and damper plate (Figure 4, Item 4) are positioned properly. Secure damper plate (Figure 4, Item 4) to damper rod (Figure 4, Item 1) with screw (Figure 4, Item 2) and nut (Figure 4, Item 3).

4. Install supply and/or return duct assembly or duct cover.

5. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

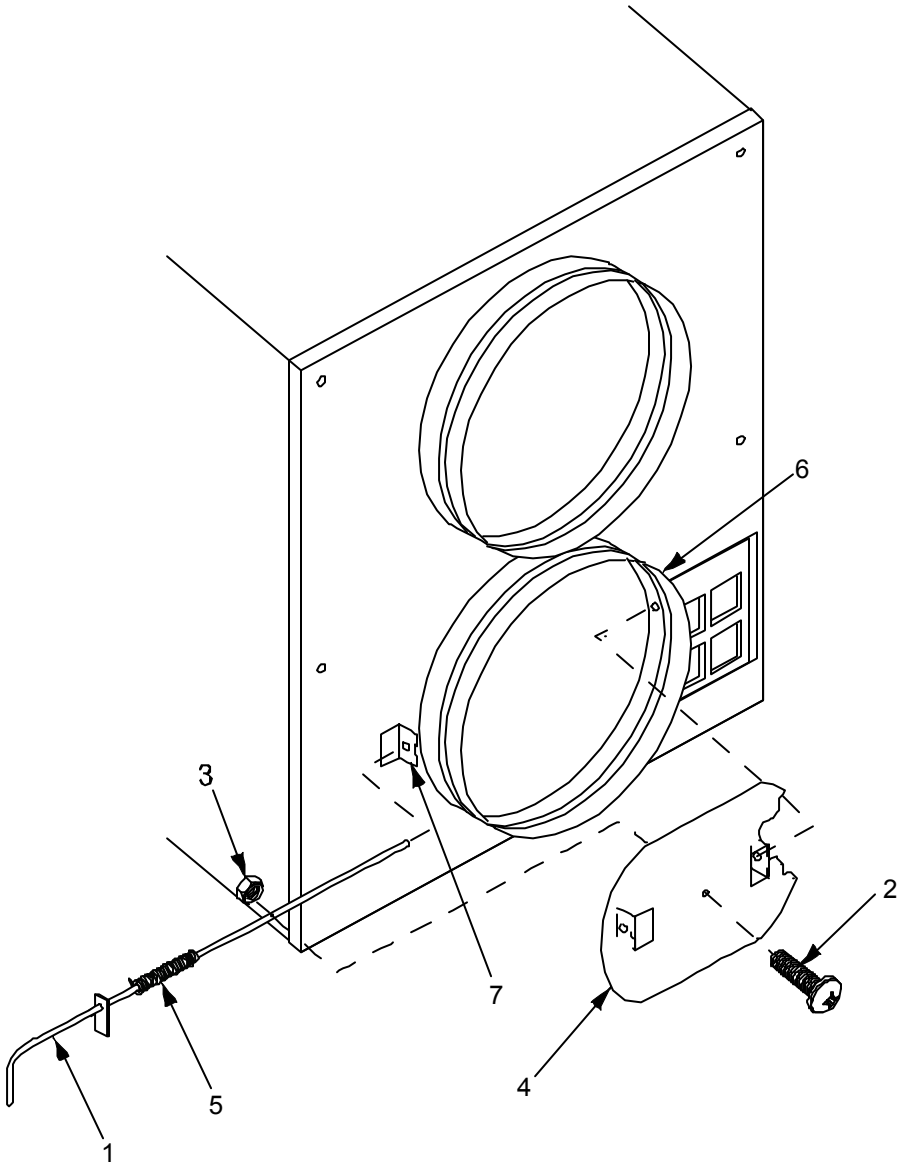


Figure 4. ECU Damper Assembly Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU HYDRONIC HEATER

GENERAL

This work package provides information on the removal and replacement of the ECU Hydronic heater and its components. They consist of:

- Hydronic heater removal/replacement
- Hydronic heater fuel pump and fuel filter removal/replacement
- Hydronic heater hoses removal/replacement
- Hydronic heater fuse removal/replacement

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the ECU.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

HYDRONIC HEATER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Hydronic heater
Drain pan
Cloth, cleaning (WP 0168, Item 14)
Rubber gloves (WP 0168, Item 24)
Safety Glasses

Personnel Required
One

References
WP 0005, WP 0022

Equipment Condition
ECU shut down

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Do not enter ECU with ECU operating or power applied. Damage to equipment or serious injury to personnel may result.

REMOVAL

1. Verify that ECU (Figure 1, Item 1) has been shut down in accordance with ECU Shut Down Procedure (WP 0005).

2. Unlatch and remove front and rear access panels (Figure 1, Item 2) and set aside.

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

3. Loosen hose clamp (Figure 1, Item 8) on hydronic heater fuel line (Figure 1, Item 7) at the fuel pump (Figure 1, Item 9) and disconnect fuel line (Figure 1, Item 7). Guide fuel line (Figure 1, Item 7) to spill bucket and allow fuel to drain out of system.

4. Loosen hose clamp (Figure 1, Item 6) that secures cool fluid input hose (Figure 1, Item 10) on the heater body (Figure 1, Item 3) and disconnect cool fluid input hose (Figure 1, Item 10).

5. Loosen spring clamp (Figure 1, Item 14) that secures fresh air intake hose (Figure 1, Item 13) to the heater body (Figure 1, Item 3). Remove fresh air intake hose (Figure 1, Item 13) from the heater body (Figure 1, Item 3).

6. Loosen spring clamp (Figure 1, Item 12) that secures hot output hose (Figure 1, Item 11) to the heater body (Figure 1, Item 3). Remove hot output hose (Figure 1, Item 11) from the heater body (Figure 1, Item 3).

REMOVAL - Continued

7. Loosen spring clamp (Figure 1, Item 4) that secures exhaust hose (Figure 1, Item 5). Remove exhaust hose (Figure 1, Item 5) from the heater body (Figure 1, Item 3).

8. Remove and retain three nuts (Figure 1, Item 15) and washers (Figure 1, Item 16) that secure hydronic heater body (Figure 1, Item 3) to hydronic heater tank mounting bracket (Figure 1, Item 17).

9. Remove the hydronic heater body (Figure 1, Item 3) from the ECU enclosure.

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps:

- Inspect all clamps and hoses. Ensure that hoses are not damaged (cuts, nicks, etc.). Ensure that all hoses are not excessively worn or appear to be unserviceable. Ensure that clamps are in good working order.
- Inspect hydronic heater fuel filter. Ensure that fuel filter is not excessively dirty, worn, or is in other need of servicing.
- Inspect hydronic heater fuel pump. Ensure that fuel pump is not excessively damaged or otherwise appears to be unserviceable.

1. Align hydronic heater body (Figure 1, Item 3) with proper holes on hydronic heater tank mounting bracket (Figure 1, Item 17) and secure using three nuts (Figure 1, Item 15) and washers (Figure 1, Item 16).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

2. Connect hydronic heater fuel line (Figure 1, Item 7) to fuel pump (Figure 1, Item 9). Secure with hose clamp (Figure 1, Item 8).

3. Connect cool fluid input hose (Figure 1, Item 10) to proper port on heater body (Figure 1, Item 3). Secure with hose clamp (Figure 1, Item 6).

4. Connect fresh air intake hose (Figure 1, Item 13) to proper port on heater body (Figure 1, Item 3). Secure with spring clamp (Figure 1, Item 14).

5. Connect exhaust hose (Figure 1, Item 5) to proper port on heater body (Figure 1, Item 3) and secure with spring clamp (Figure 1, Item 4).

6. Connect hot output hose (Figure 1, Item 11) to the heater body (Figure 1, Item 3). Secure with spring clamp (Figure 1, Item 12).

7. Check and refill coolant levels in accordance with Crew Maintenance Instructions (WP 0022) of this TM.

8. Clean up any excess spillage from base of ECU.

REPLACEMENT - Continued

9. Install and secure front and rear access panels (Figure 1, Item 2).

10. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

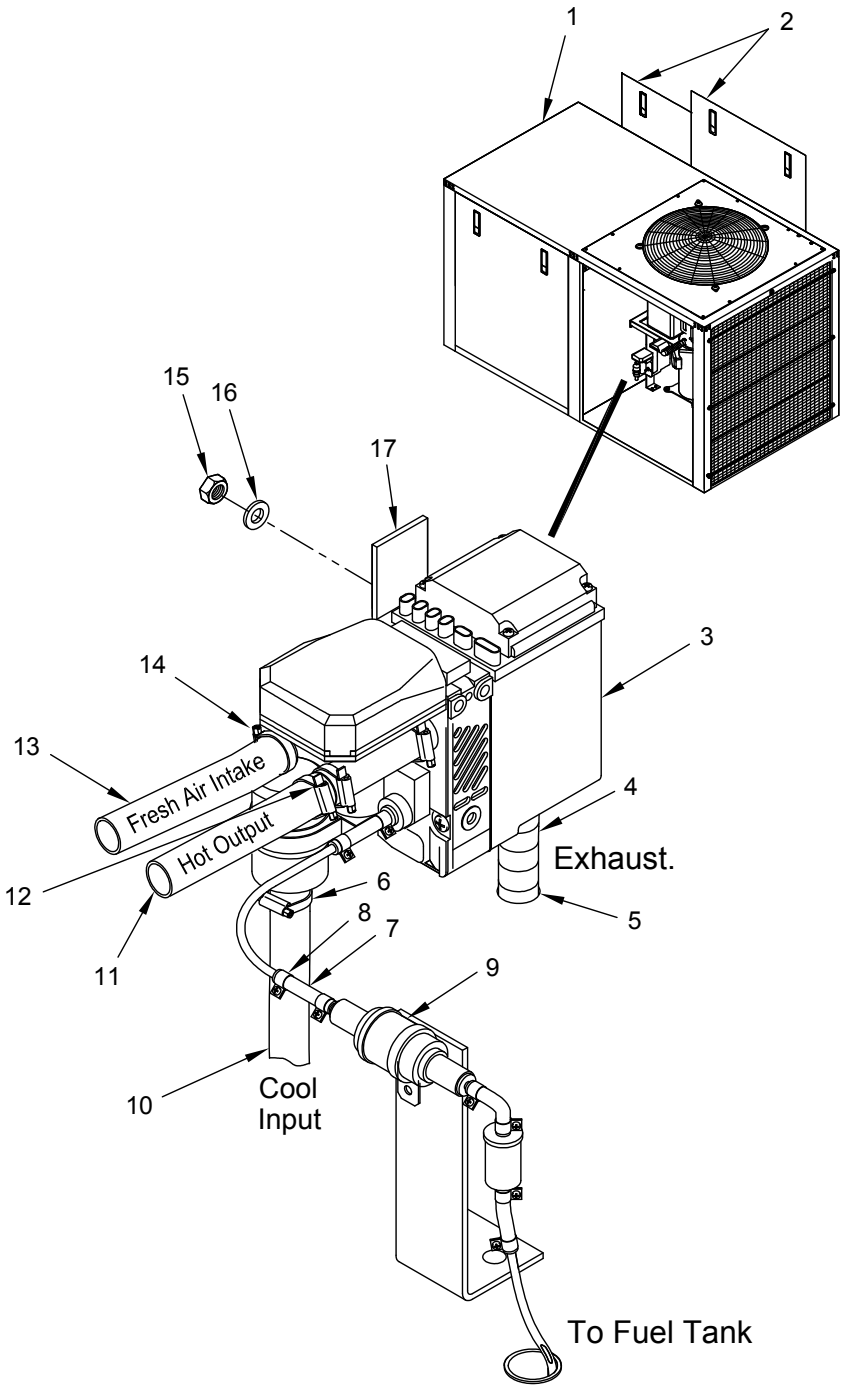


Figure 1. Hydronic Heater Removal/Replacement.

END OF TASK

HYDRONIC HEATER FUEL PUMP AND FUEL FILTER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Fuel pump
Fuel filter
Drain pan
Cloth, cleaning (WP 0168, Item 14)
Rubber gloves (WP 0168, Item 24)
Safety Glasses

Personnel Required
One

References
WP 0005

Equipment Condition
ECU shut down

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Do not enter ECU with ECU operating or power applied. Damage to equipment or serious injury to personnel may result.

FUEL PUMP

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Disconnect the ECU power cable from the J1 connector on the Genset or from a shore power supply.
3. Unlatch and remove rear access panel (Figure 2, Item 1) and set aside.
4. Disconnect electrical cable (Figure 2, Item 16) from fuel pump (Figure 2, Item 4).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

5. Loosen hose clamp (Figure 2, Item 3) and disconnect fuel line (Figure 2, Item 2) (heater side) from fuel pump (Figure 2, Item 4). Guide fuel line (Figure 2, Item 2) to spill bucket and allow fuel to drain.
6. Loosen second hose clamp (Figure 2, Item 8) and disconnect fuel line (Figure 2, Item 9) (filter side) from fuel pump (Figure 2, Item 4).

REMOVAL – Continued

7. Remove and retain screw (Figure 2, Item 6), flat washer (Figure 2, Item 7), and nut (Figure 2, Item 15), that secures fuel pump (Figure 2, Item 4) and clamp (Figure 2, Item 5) to bracket (Figure 2, Item 14).

8. Remove fuel pump (Figure 2, Item 4) and clamp (Figure 2, Item 5).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps:
- Inspect all clamps and hoses. Ensure that hoses are not damaged (cuts, nicks, etc.). Ensure that all hoses are not excessively worn or appear to be unserviceable. Ensure that clamps are in good working order.
- Inspect hydronic heater fuel filter. Ensure that fuel filter is not excessively dirty, worn, or is in other need of servicing.

When performing the following steps verify that fuel pump (Figure 2, Item 3) is installed in the proper direction. Arrow should point towards fuel line going to hydronic heater.

1. Install clamp (Figure 2, Item 5) onto fuel pump (Figure 2, Item 4). Secure assembly to bracket (Figure 2, Item 14) with screw (Figure 2, Item 6), flat washer (Figure 2, Item 7), and nut (Figure 2, Item 15).

2. Connect fuel line (Figure 2, Item 9) (filter side) to fuel pump (Figure 2, Item 4) and secure with clamp (Figure 2, Item 8).

3. Connect fuel line (Figure 2, Item 2) (heater side) to fuel pump (Figure 2, Item 4) and secure with hose clamp (Figure 2, Item 3).

4. Connect electrical cable (Figure 2, Item 16) to fuel pump (Figure 2, Item 4).

5. Clean up any excess spillage from base of ECU.

6. Install and secure front and rear access panels (Figure 2, Item 1).

7. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

END OF TASK

FUEL FILTER

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).

2. Disconnect the ECU power cable from the J1 connector on the Genset or from a shore power supply.

3. Unlatch and remove access panel (Figure 2, Item 1) and set aside.

REMOVAL – Continued

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

4. Loosen hose clamp (Figure 2, Item 10) and disconnect fuel line (Figure 2, Item 9) (fuel pump side) from fuel filter (Figure 2, Item 11).

NOTE

When performing the following step, do not let fuel line fall through frame.

5. Loosen second hose clamp (Figure 2, Item 12) and disconnect fuel filter (Figure 2, Item 11) from fuel line (Figure 2, Item 13) (fuel tank side).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps:

- Inspect all clamps and hoses. Ensure that hoses are not damaged (cuts, nicks, etc.). Ensure that all hoses are not excessively worn or appear to be unserviceable. Ensure that clamps are in good working order.
- Inspect hydronic heater fuel pump. Ensure that fuel pump is not excessively damaged or otherwise appears to be unserviceable.

When performing the following steps verify that fuel filter (Figure 2, Item 11) is installed in the proper direction. Arrow should point towards fuel line going to hydronic heater.

1. Connect fuel filter (Figure 2, Item 11) to fuel line (Figure 2, Item 13) (fuel tank side) and secure with hose clamp (Figure 2, Item 12).
2. Connect fuel line (Figure 2, Item 9) (fuel pump side) to fuel filter (Figure 2, Item 11) and secure with hose clamp (Figure 2, Item 10).
3. Clean up any excess spillage from base of ECU.
4. Install and secure access panel (Figure 2, Item 1).
5. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

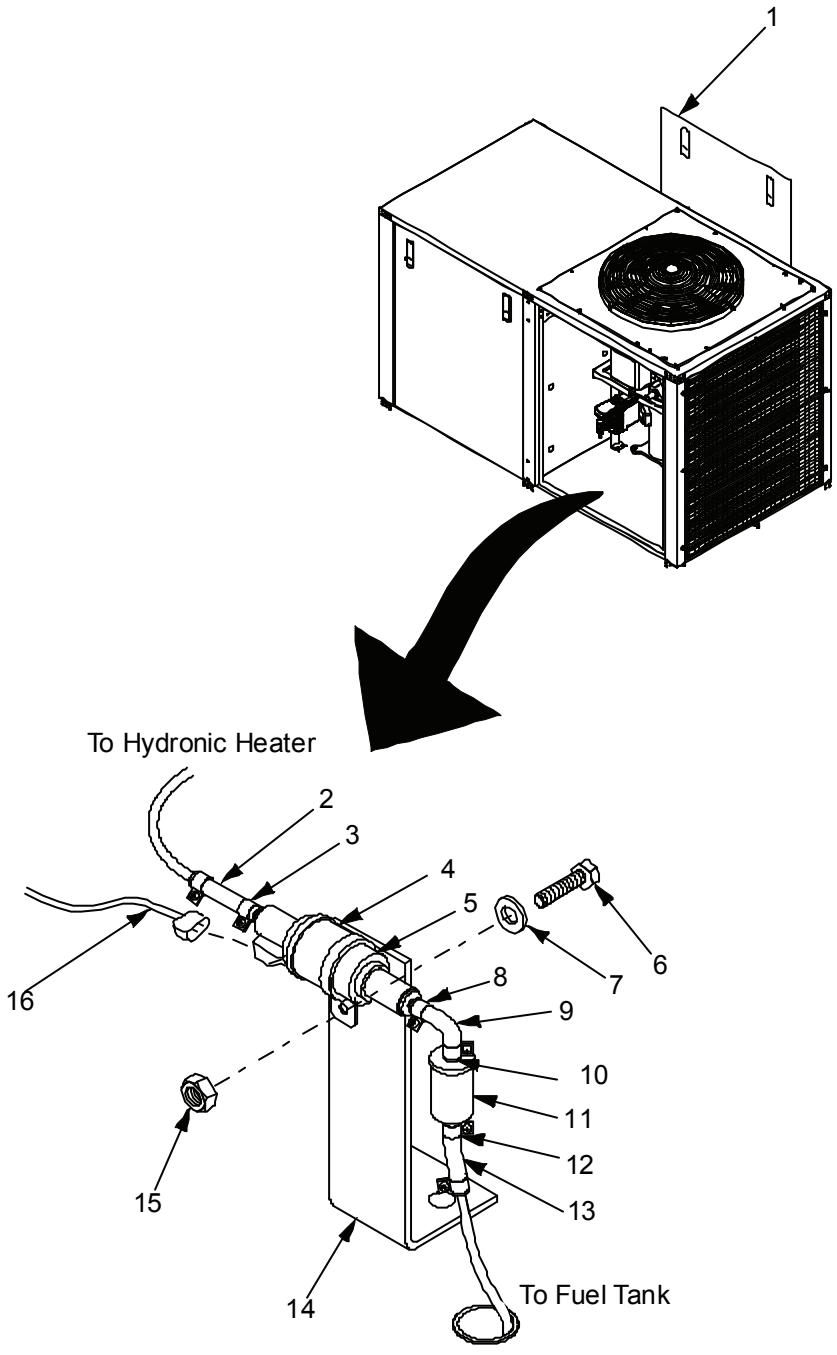


Figure 2. Hydronic Heater Fuel Pump and Fuel Filter Removal/Replacement.

END OF TASK

HYDRONIC HEATER HOSE REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Hydronic heater hoses
Drain pan
Cloth, cleaning (WP 0168, Item 14)
Rubber gloves (WP 0168, Item 24)
Safety Glasses

Personnel Required
One

References
WP 0005, WP 0022

Equipment Condition
ECU shut down

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Do not enter ECU with ECU operating or power applied. Damage to equipment or serious injury to personnel may result.

REMOVAL

1. Verify that ECU (Figure 3, Item 1) has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Unlatch and remove front and rear access panels (Figure 3, Item 2) and set aside. Identify hose to be replaced, air (Figure 3, Item 6), fuel (Figure 3, Item 4), coolant (Figure 3, Item 5), or exhaust (Figure 3, Item 3).

NOTE

When coolant hoses are disconnected, the coolant reservoir will drain. Drain coolant into a clean container to allow reuse.

3. Using either a flat tip screw driver or the appropriate socket and ratchet, loosen the hose clamps on both ends of the hose to be replaced.
4. Place a drip bucket or absorbent pad under the connection to be broken in case of spillage.
5. Grasp the hose with hands or a pair of pliers and rotate the hose close to the connection to break the connection.
6. Pull the hose away from the connection using a twisting motion until it comes free.
7. Repeat steps 4 through 6 to remove the other end of the hose.
8. Remove the hose clamps if they are to be reused and discard hose.

END OF TASK

REPLACEMENT

NOTE

Ensure that replacement hose is the same length and diameter of the original hose.

1. Place hose clamps onto replacement hose loosely and slide to center of hose.

NOTE

Ensure that the hose clamps are placed on the hose in such a way that the screws will be accessible once slid into place.

2. Most connections have a ridge built into them to facilitate a good seal when the hose clamp is tightened down. Identify the location of the ridge on the first side.
3. Using a twisting motion slide the hose onto the first connection. Ensure hose is slid back far enough.
4. Slide hose clamp down into position.
5. Repeat steps 2 through 4 for other end of hose.
6. Ensure hose is not twisted.
7. Tighten down hose clamps using flat tip screwdriver or socket and ratchet, until hose clamp begins to press into hose.

NOTE

Over tightening the hose clamp can result in damage to the hose and premature failure.

If replacing coolant hose, see Crew Maintenance Instructions (WP 0022) to check and refill engine coolant levels.

8. Clean up any excess spillage from base of ECU.
9. Install and secure access panels (Figure 3, Item 2).
10. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

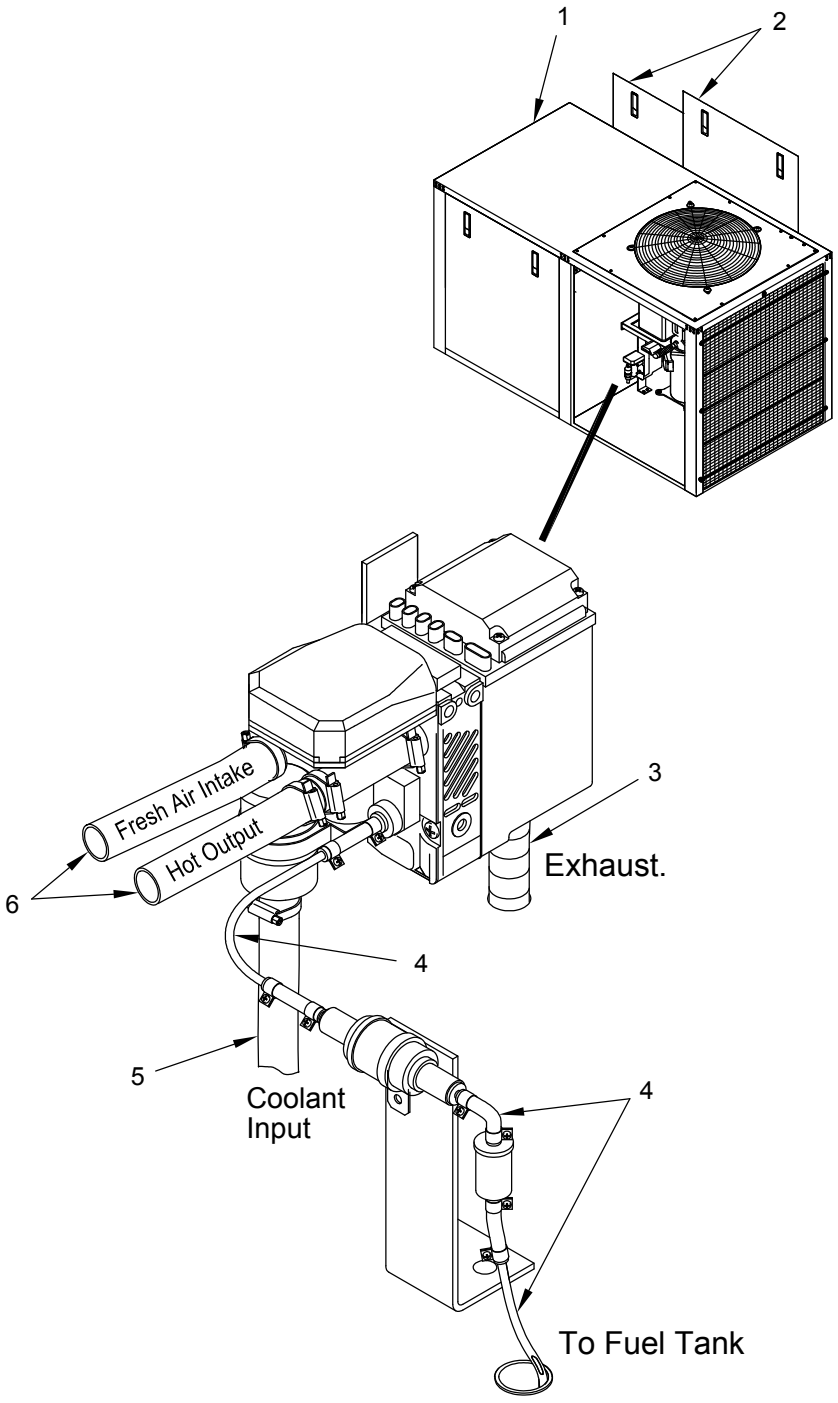


Figure 3. Hydronic Heater Hose Removal/Replacement.

END OF TASK

HYDRONIC HEATER FUSE REMOVAL/REPLACEMENT

INITIAL SETUP:

Materials/Parts
Fuse

References
WP 0005

Personnel Required
One

Equipment Condition
Genset shutdown
BATTERY switch - OFF

WARNING

High voltage and amperage present at electrical connections. Do not enter ECU with power applied. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with ECU operating.

REMOVAL

1. Verify that ECU (Figure 4, Item 1) has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Remove front access door (Figure 4, Item 2) on Genset and set aside.
3. Locate fuse holder (Figure 4, Item 6) on hydronic heater (Figure 4, Item 3) and open cover.
4. Identify and remove bad fuse (Figure 4, Items 4 or 5).

END OF TASK

REPLACEMENT

1. Replace fuse (Figure 4, Items 4 or 5) with proper type and value.
2. Close cover on fuse holder (Figure 4, Item 6).
3. Install access door (Figure 4, Item 2).
4. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

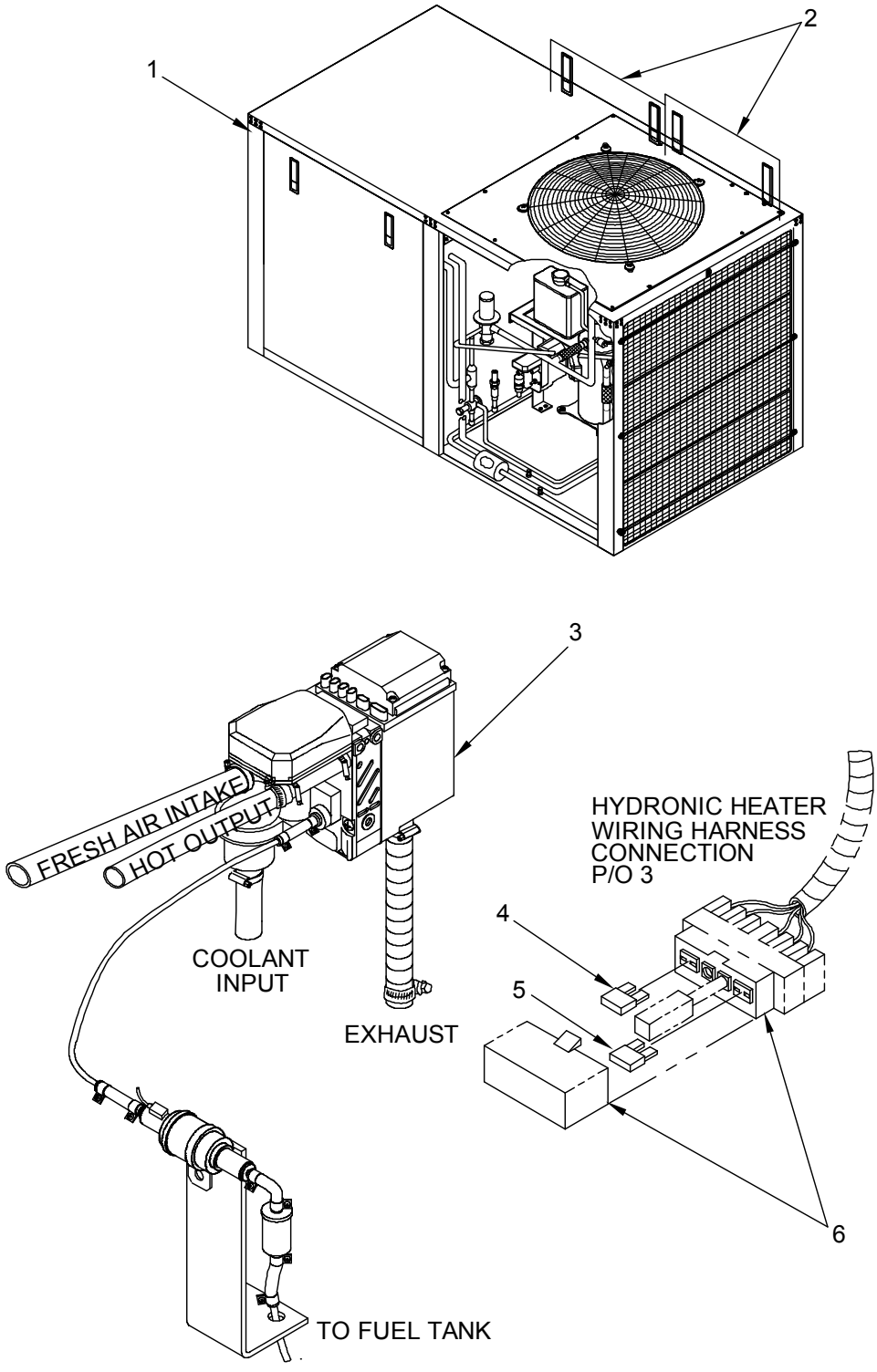


Figure 4. Hydronic Heater Fuse Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU – CUT-OFF SWITCHES

GENERAL

This work package provides information on removal and replacement of the following components on the ECU:

- High temperature cut-off switch
- High Pressure cut-off switch
- Low Pressure cut-off switch

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

The following procedures require the use of open flame (brazing). Be observant of all fluids and components surrounding area being brazed. Do not damage, equipment or fluids and components. Only properly trained personnel should attempt to perform brazing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

REFRIGERANT UNDER PRESSURE

Death or severe injury may result if you fail to observe safety precautions. Never use a heating torch on any part of the system that contains refrigerant. Do not let liquid refrigerant touch you, and do not inhale refrigerant gas

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

If necessary, refer to (WP 0027) for troubleshooting and (Figures FO-1 through FO-5) for schematics/wiring diagrams.

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties

HIGH TEMPERATURE CUT-OFF SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:

Materials/Parts
Switch
Safety glasses

Personnel Required
One

Reference
WP 0005, WP 0030, FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

REMOVAL

NOTE

If necessary refer to (WP 0027) for test of switch.

The high temperature cut-off is located on the blower assembly frame near the blower motor.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access panel (Figure 1, Item 1) from ECU and set aside.
3. Mark and disconnect two terminals (38A and 39A) (Figure 1, Item 3) from temperature cut-off switch (Figure 1, Item 4).
4. Rotate temperature cut-off switch (Figure 1, Item 4) until tabs (Figure 1, Item 2) align with notches and remove temperature cut-off switch (Figure 1, Item 4).

END OF TASK

REPLACEMENT

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

1. Align notches in temperature cut-off switch (Figure 1, Item 4) with tabs (Figure 1, Item 2) in mount and insert. Twist temperature cut-off switch (Figure 1, Item 4) until it is locked into place.
2. Connect two terminals (38A and 39A) (Figure 1, Item 3) to temperature cut-off switch (Figure 1, Item 4).
3. Replace access panel (Figure 1, Item 1).
4. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

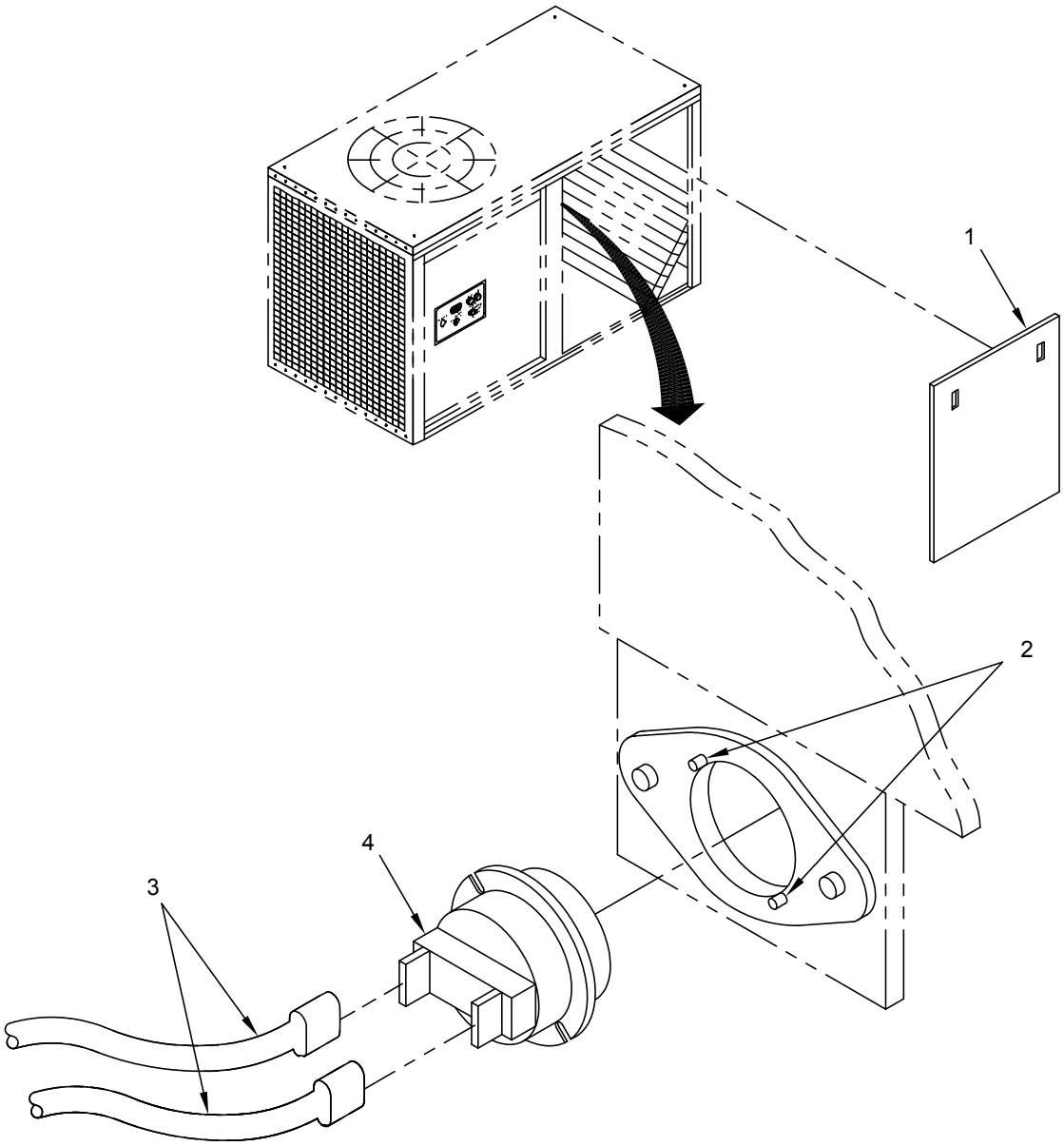


Figure 1. High Temperature Cut-off Switch Removal/Replacement.

END OF TASK

HIGH PRESSURE CUT-OFF SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Refrigeration service tool kit (WP 0165, Item 3)
Safety glasses/face shield
Gloves, rubber (WP 0168, Item 24)

Materials/Parts
Switch

Personnel Required
One

Reference
WP 0005, WP 0027, WP 0102, WP 0110, WP 0111, WP 0113, FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

The following procedures require the use of open flame (brazing). Be observant of all fluids and components surrounding area being brazed. Do not damage, equipment or fluids and components. Only properly trained personnel should attempt to perform brazing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary refer to (WP 0027) for test of switch.

The high pressure cut-off switch is located near the condenser coil.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.

2. Remove access panel (Figure 2, Item 1) from ECU and set aside.

3. Recover refrigerant as described in (WP 0113) of this TM.

REMOVAL - Continued

4. Mark and disconnect two terminals (43B and 44A) (Figure 2, Item 4) from high pressure cut-off switch electrical connection (Figure 2, Item 3) and set aside.

5. Un-braze mounting joint as described in (WP 0110) of this TM and remove high pressure cut-off switch (Figure 2, Item 2).

END OF TASK

REPLACEMENT

WARNING

The following procedures require the use of open flame (brazing). Be observant of all fluids and components surrounding area being brazed. Do not damage, equipment or fluids and components. Only properly trained personnel should attempt to perform brazing procedures.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties

1. Install high pressure cut-off switch (Figure 2, Item 2) and braze mounting joint as described in (WP 0110) of this TM.

2. Connect two terminals (43B and 44A) (Figure 2, Item 4) from wiring harness to high pressure cut-off switch electrical connection (Figure 2, Item 3) and cover with appropriate insulation.

3. Replace filter/dryer as described in (WP 0102).

4. Leak test as described in (WP 0111) of this TM.

5. Charge system with 8.4 lbs. (3.18 Kg) of R-407c refrigerant as described in (WP 0113) of this TM.

6. Replace access panel (Figure 2, Item 1).

7. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

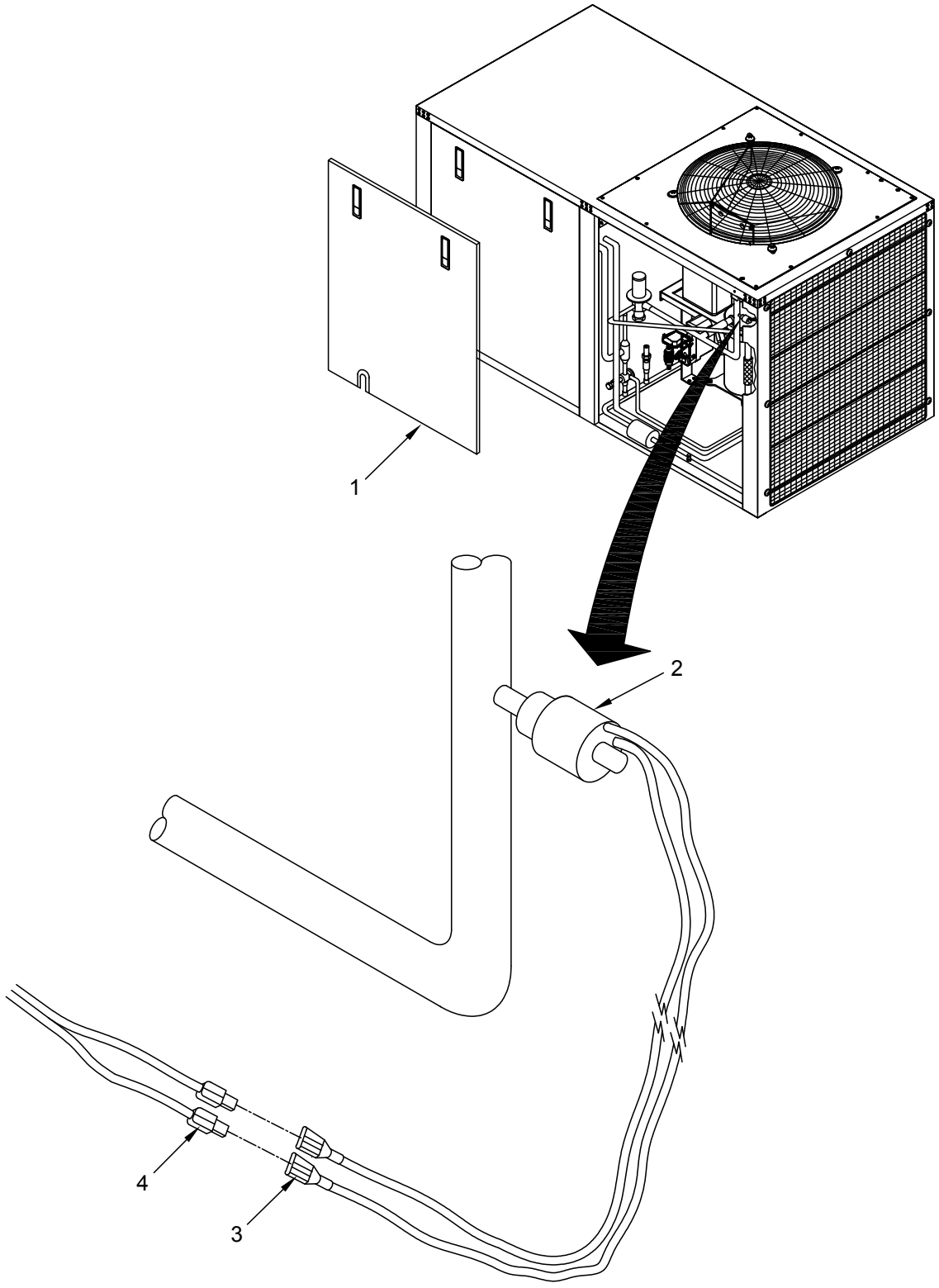


Figure 2. High Pressure Cut-Off Switch Removal/Replacement.

END OF TASK

LOW PRESSURE CUT-OFF SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Refrigeration service tool kit (WP 0165, Item 3)
Safety glasses/face shield
Gloves, rubber (WP 0168, Item 24)

Materials/Parts
Switch

Personnel Required
One

Reference
WP 0005, WP 0027,
WP 0110, WP 0112
FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected
from J1 on Genset

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary refer to (WP 0027) for test of switch. The low pressure cut-off switch is located near the condenser coil.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.

2. Remove access panel (Figure 3, Item 1) from ECU and set aside.

3. Recover refrigerant as described in (WP 0113) of this TM.

REMOVAL – Continued

4. Mark and disconnect two terminals (41C and 43A) (Figure 3, Item 3) from low pressure cut-off switch electrical connection (Figure 3, Item 4) and set aside.

5. Unscrew low pressure cut-off switch (Figure 3, Item 2) and remove.

END OF TASK

REPLACEMENT

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

1. Install low pressure cut-off switch (Figure 3, Item 2) and tighten.

2. Connect two terminals (41C and 43A) (Figure 2, Item 3) from wiring harness to low pressure cut-off switch electrical connection (Figure 3, Item 4).

3. Replace filter/dryer as described in (WP 0102).

4. Leak test as described in (WP 0111) of this TM.

5. Charge system with 8.4 lbs. (3.18 Kg) of R-407c refrigerant as described in (WP 0113) of this TM.

6. Replace access panel (Figure 3, Item 1).

7. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

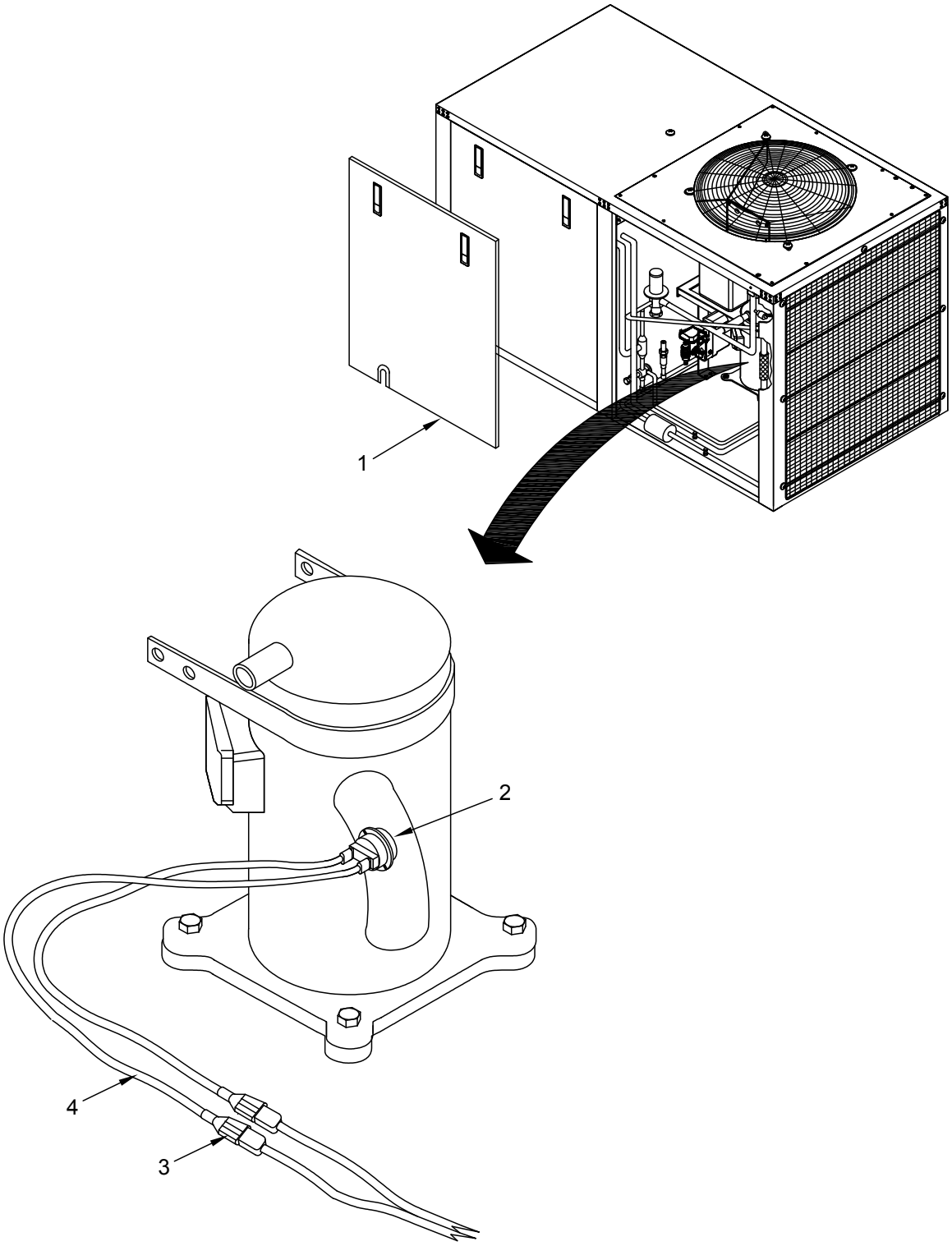


Figure 3. Low Pressure Cut-Off Switch Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU – EVAPORATOR FAN MOTOR

GENERAL

This work package provides information on the removal and replacement of components on the ECU evaporator fan motor.

WARNING

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present at the PDP. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Be observant of the fire extinguisher and its associated bracket when working around the TMSS-MED. It is located in such a spot where it may catch on equipment and cause damage or on personnel and cause injury.

NOTE

If necessary, refer to (WP 0027) for troubleshooting and (Figures FO-1 through FO-5) for schematics/wiring diagrams.

EVAPORATOR MOTOR REMOVAL/REPLACEMENT/ADJUSTMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Electronic equipment tool kit (WP 0165, Item 4)
Safety glasses

Materials/Parts
Motor

Personnel Required
One

Reference
WP 0005, WP 0098

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

REMOVAL

WARNING

Be observant of the fire extinguisher and its associated bracket when working around the TMSS-MED. It is located in such a spot where it may catch on equipment and cause damage or on personnel and cause injury.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Open rear evaporator chamber access panel (Figure 1, Item 7) on ECU.
3. Loosen but do not remove four mounting nuts (Figure 1, Item 2), lock washers (Figure 1, Item 3), and flat washers (Figure 1, Item 4) on evaporator fan motor mounting studs (Figure 1, Item 8).
4. Push the evaporator fan motor (Figure 1, Item 9) upwards along the mounting studs (Figure 1, Item 8) to decrease tension on belt (Figure 1, Item 11).
5. Slide belt (Figure 1, Item 11) off of evaporator motor pulley (Figure 1, Item 10) and blower pulley (Figure 1, Item 12).
6. Finish removing four nuts (Figure 1, Item 2), lock washers (Figure 1, Item 3), and flat washers (Figure 1, Item 4)

CAUTION

When performing the following step, be observant of heater coils. Do not allow motor to damage heater coil. Electrical connections are still present on evaporator motor.

7. Remove evaporator motor (Figure 1, Item 9) from studs (Figure 1, Item 8) and turn to gain access to electrical connections.
8. Remove and retain two screws (Figure 1, Item 5) and cover (Figure 1, Item 6) on evaporator motor (Figure 1, Item 9) mark and disconnect electrical wiring.
9. Remove evaporator motor (Figure 1, Item 9) from ECU and set aside.

END OF TASK

REPLACEMENT

WARNING

Be observant of the fire extinguisher and its associated bracket when working around the TMSS-MED. It is located in such a spot where it may catch on equipment and cause damage or on personnel and cause injury.

1. Remove and retain two screws (Figure 1, Item 5) and cover (Figure 1, Item 6) on evaporator motor (Figure 1, Item 9) and connect electrical wiring (see Table 1). Install cover and secure using two screws.

Table 1. Evaporator Motor Electrical Connections.

Wire Color	Motor Connection	Harness Connection (Wire #)
Green	Ground	11B
White	T1/T7	15
Red	T2/T8	16
Black	T3/T9	17
	T4/T5/T6	No Connection

2. Place evaporator motor (Figure 1, Item 9) onto mounting studs (Figure 1, Item 8) and loosely install four nuts (Figure 1, Item 2), lock washers (Figure 1, Item 3), and flat washers (Figure 1, Item 4).

NOTE

Prior to performing the following step inspect evaporator motor belt. Ensure that no visible damage is present.

3. Slide belt (Figure 1, Item 11) over evaporator motor pulley (Figure 1, Item 10) and blower pulley (Figure 1, Item 12).

NOTE

When performing the following steps, deflection of belt (Figure 1, Item 11) should not be greater than one inch.

4. Move evaporator fan motor (Figure 1, Item 9) to make proper tension adjustment to belt (Figure 1, Item 11).
   - Down to increase the tension on the evaporator motor belt (Figure 1, Item 11).
   - Up to the decrease tension on the evaporator motor belt (Figure 1, Item 11).

5. Tighten four mounting nuts (Figure 1, Item 2), lock washers (Figure 1, Item 3), and flat washers (Figure 1, Item 4) on the evaporator fan motor mounting studs (Figure 1, Item 8).

6. Verify tension of evaporator motor belt (Figure 1, Item 11) as described in (WP 0098).

7. Replace rear evaporator chamber access panel (Figure 1, Item 7).

8. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

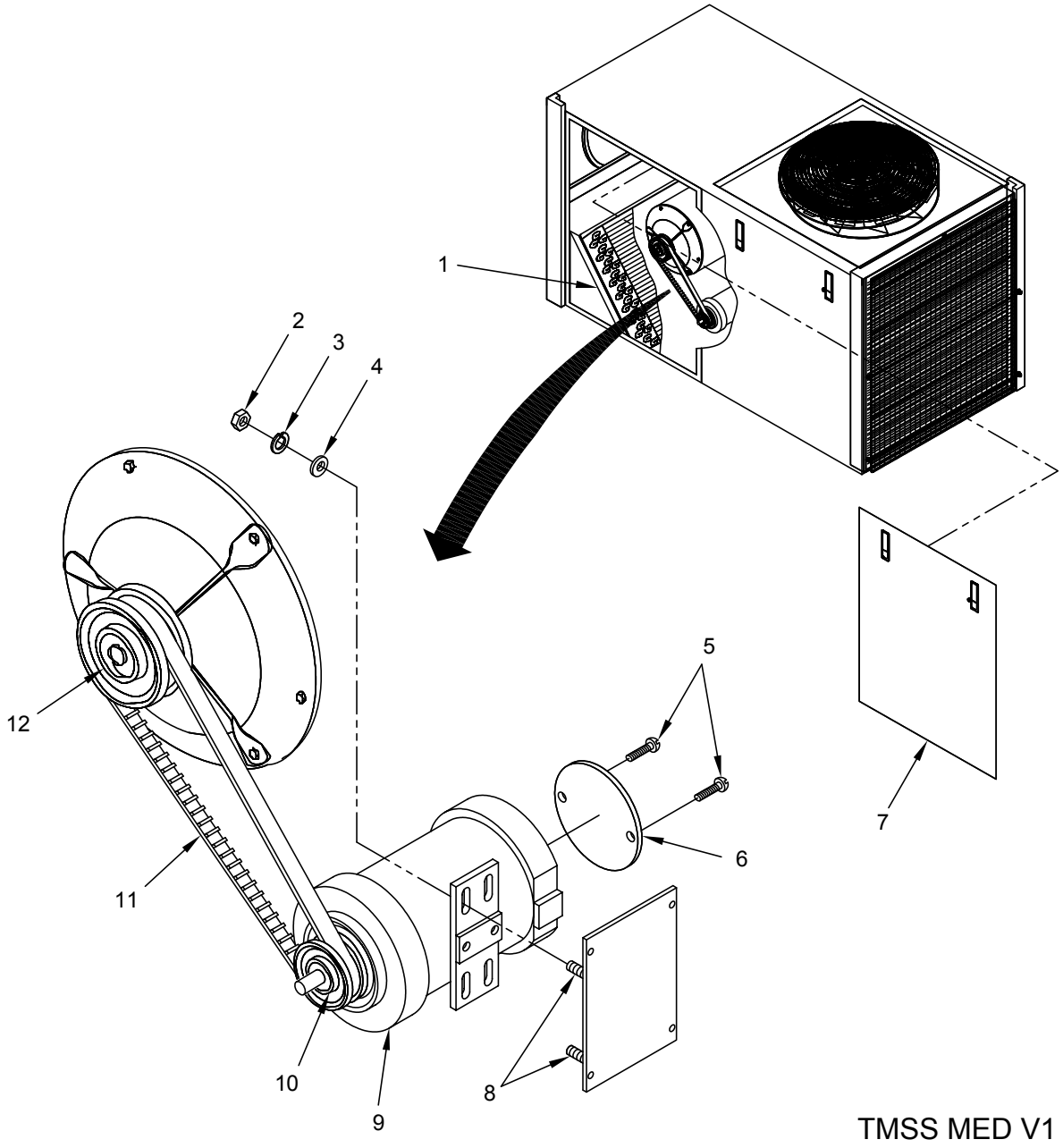


Figure 1. Evaporator Motor Removal/Replacement.

END OF TASK

EVAPORATOR BLOWER FAN REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Safety glasses

Materials/Parts
Blower fan

Personnel Required
Two

Reference
WP 0005

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

REMOVAL

WARNING

Be observant of the fire extinguisher and its associated bracket when working around the TMSS-MED. It is located in such a spot where it may catch on equipment and cause damage or on personnel and cause injury.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.

NOTE

If necessary, refer to procedure in this WP for steps 2 through 4.

2. Remove rear evaporator chamber access panel (Figure 1, Item 7) and set aside.
3. Loosen hardware that supports evaporator fan motor.
4. Push the evaporator fan motor upwards along the mounting studs to decrease tension on the belt (Figure 2, Item 7).
5. Slide belt (Figure 2, Item 7) off of blower pulley (Figure 2, Item 8).
6. Remove and retain three nuts (Figure 2, Item 10) and bolts (Figure 2, Item 11) that secure bearing supports (Figure 2, Item 4) onto bearing (Figure 2, Item 6).
7. Loosen but do not remove three bolts (Figure 2, Item 12) that secure brackets (Figure 2, Item 4) on control panel side of ECU.
8. Remove and retain three nuts (Figure 2, Item 10) and bolts (Figure 2, Item 11) that secure bearing supports (Figure 2, Item 4) on control panel side of ECU.
9. Loosen three bolts (Figure 2, Item 5) that secure bearing supports (Figure 2, Item 4) onto fan shroud (Figure 2, Item 3) and rotate bearing supports (Figure 2, Item 4) away from bearing (Figure 2, Item 6).
10. Remove and retain six mounting bolts (three loosened in previous step and three additional) (Figure 2, Items 5 and 12) that secure blower fan (Figure 2, Item 2) to enclosure (Figure 2, Item 1).

REMOVAL - Continued

11 Slide blower fan (Figure 2, Item 2) out and place on a suitable work area.

12. Remove and retain fan shroud (Figure 2, Item 3) and bearing supports (Figure 2, Item 4).

13. Using a center puller, remove pulley assembly (Figure 2, Item 8) and key (Figure 2, Item 9) from shaft of blower fan (Figure 2, Item 2).

END OF TASK

REPLACEMENT

WARNING

Be observant of the fire extinguisher and its associated bracket when working around the TMSS-MED. It is located in such a spot where it may catch on equipment and cause damage or on personnel and cause injury.

1. Place blower fan (Figure 2, Item 2) on a suitable work area and mount pulley assembly (Figure 2, Item 8) and key (Figure 2, Item 9) onto shaft of blower fan (Figure 2, Item 2).

2. Install fan shroud (Figure 2, Item 3) and bearing supports (Figure 2, Item 4) onto blower fan (Figure 2, Item 2). Support by installing three nuts (Figure 2, Item 10) and bolts (Figure 2, Item 11) onto bearing supports (Figure 2, Item 4).

3. Install assembled blower fan (Figure 2, Item 2) into enclosure (Figure 2, Item 1) and align bearing supports (Figure 2, Item 4).

4. Install three bearing supports (Figure 2, Item 4) onto bearing (Figure 2, Item 6) (on control panel side of ECU) and loosely install three mounting bolts (Figure 2, Item 12) and nuts (Figure 2, Item 10).

5. Properly position bearing supports (Figure 2, Item 4) (on Genset side of ECU) and install three bolts (Figure 2, Item 5).

6. Verify that all hardware has been properly tightened.

NOTE

Prior to performing the following step inspect evaporator motor belt. Ensure that no visible damage is present.

7. Slide belt (Figure 2, Item 7) over blower pulley (Figure 2, Item 8) and evaporator motor pulley (Figure 1, Item 10).

NOTE

When performing the following steps, deflection of belt (Figure 2, Item 7) should not be greater than one inch.

If necessary, refer to procedure in this WP for steps 2 through 4.

8. Move motor to make proper tension adjustment to belt.
   - Down to increase the tension on belt.
   - Up to the decrease tension on belt.

REPLACEMENT – Continued

NOTE

When performing the following step, tighten hardware on control panel side of ECU first.

9. Tighten hardware on fan motor mounting studs.
10. Verify tension of evaporator motor belt (Figure 1, Item 11).
11. Replace rear evaporator chamber access panel.
12. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

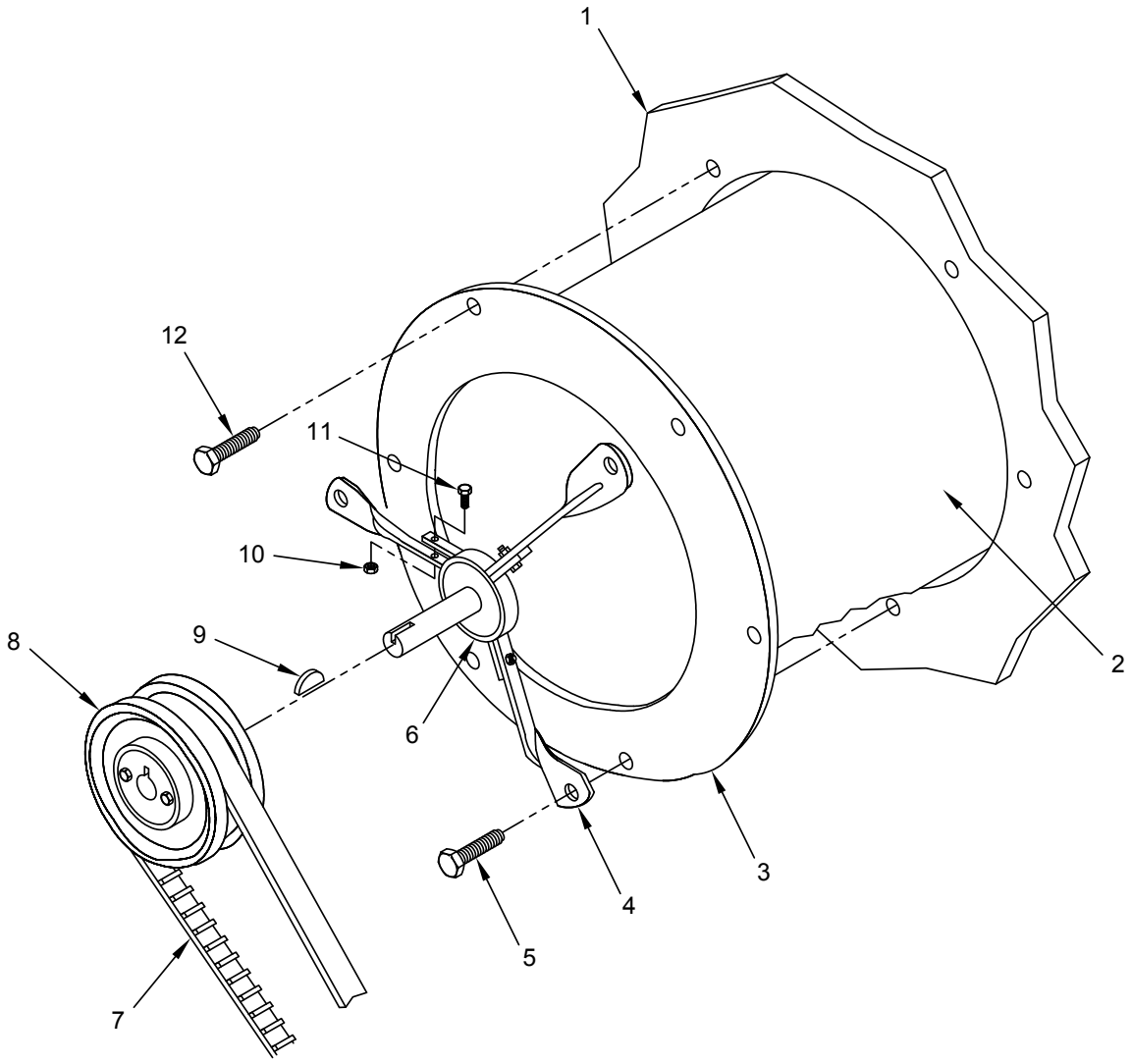


Figure 2. Evaporator Blower Fan Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU – CONDENSER FAN MOTOR

GENERAL

This work package provides information on the removal and replacement of components on the ECU condenser fan motor.

WARNING

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present at the PDP. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

NOTE

If necessary, refer to (WP 0027) for troubleshooting and (Figures FO-1 through FO-5) for schematics/wiring diagrams.

CONDENSER FAN MOTOR REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Electronic equipment tool kit (WP 0165, Item 4)
Safety glasses

Materials/Parts
Motor

Personnel Required
Two

Reference
WP 0005, WP 0030
FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

REMOVAL

NOTE

If necessary refer to (WP 0030) for test of the blower.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access panel (Figure 1, Item 10) from ECU and set aside.
3. Remove and retain four screws (Figure 1, Item 1) that secure fan guard (Figure 1, Item 2) to top of ECU. Remove fan guard (Figure 1, Item 2).
4. Mark and disconnect electrical wiring from condenser fan motor (Figure 1, Item 6).

NOTE

The following steps require two personnel, one inside the ECU and one on top.

5. Remove and retain four nuts (Figure 1, Item 9), bolts (Figure 1, Item 3) and flat washers (Figure 1, Item 8) that secure condenser fan motor (Figure 1, Item 6) to frame (Figure 1, Item 7).
6. Remove and retain two screws (Figure 1, Item 5) and cover (Figure 1, Item 4) on condenser fan motor (Figure 1, Item 6).

WARNING

HEAVY EQUIPMENT

Improperly lifting or carrying heavy equipment can result in serious injury or death. Refer to weight limits as outlined in front matter of this TM.

7. Remove condenser fan motor (Figure 1, Item 6) from top of ECU and set aside.
8. Using puller, remove fan blade assembly (Figure 1, Item 11) and key (Figure 1, Item 12) from shaft of condenser fan motor (Figure 1, Item 6).

END OF TASK

REPLACEMENT

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

The following steps require two personnel, one inside the ECU and one on top.

1. If applicable, install fan blade assembly (Figure 1, Item 11) and key (Figure 1, Item 12) onto shaft of condenser fan motor (Figure 1, Item 6).

2. Place condenser fan motor (Figure 1, Item 6) on top of ECU.

3. If applicable, remove and retain two screws (Figure 1, Item 5) and cover (Figure 1, Item 4) on condenser fan motor (Figure 1, Item 6).

4 Connect electrical wiring to condenser fan motor (Figure 1, Item 6) (see Table 1).

Table 1. Condenser Fan Motor Electrical Connections.

Wire Color	Motor Connection	Harness Connection (Wire #)
Green	Ground	11C
Black	T1/T7	18
Red	T2/T8	19
White	T3/T9	20
	T4/T5/T6	No Connection

5 Install cover (Figure 1, Item 4) and secure using two screws (Figure 1, Item 5).

NOTE

The following step requires two personnel, one inside the ECU and one on top.

6. Lower condenser fan motor (Figure 1, Item 6) into ECU and align with frame (Figure 1, Item 7). Secure to frame (Figure 1, Item 7) using four nuts (Figure 1, Item 9), bolts (Figure 1, Item 3) and flat washers (Figure 1, Item 8).

7. Install fan guard (Figure 1, Item 2) to top of ECU and secure using four screws (Figure 1, Item 1).

8. Replace access panel (Figure 1, Item 10).

9. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

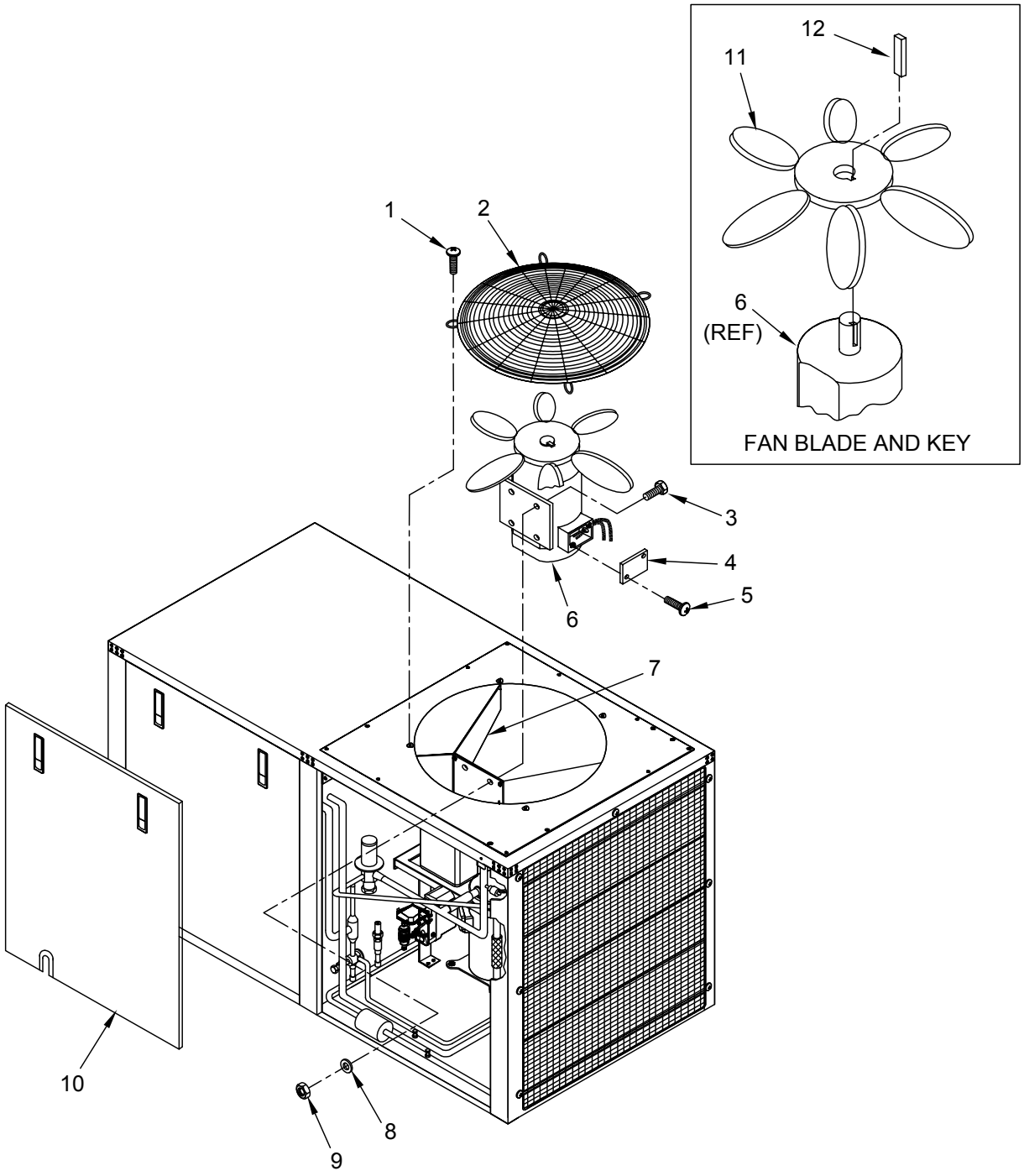


Figure 1. Condenser Fan Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU EVAPORATOR MOTOR BELT

GENERAL

This work package provides information on the maintenance of the ECU evaporator motor belt. They consist of:

- Evaporator motor belt tension adjustment
- Evaporator motor belt removal/replacement

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the ECU.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

EVAPORATOR MOTOR BELT TENSION ADJUSTMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Personnel Required
One

References
WP 0005

Equipment Condition
ECU shut down

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

ADJUSTMENT

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Unlatch and remove rear evaporator chamber access panel (Figure 1, Item 2). Set aside.
3. Loosen but do not remove four mounting nuts (Figure 1, Item 3), lock washers (Figure 1, Item 4) and flat washers (Figure 1, Item 5) on evaporator fan motor mounting studs (Figure 1, Item 6).

NOTE

When performing the following steps, deflection of evaporator motor belt (Figure 1, Item 8) should not be greater than one inch.

4. Move evaporator fan motor (Figure 1, Item 7) to make proper tension adjustment to evaporator motor belt (Figure 1, Item 8).
   - Down to increase the tension on the evaporator motor belt (Figure 1, Item 8).
   - Up to the decrease tension on the evaporator motor belt (Figure 1, Item 8).
5. Tighten four mounting nuts (Figure 1, Item 3) on the evaporator fan motor mounting studs (Figure 1, Item 6)
6. Verify tension of evaporator motor belt (Figure 1, Item 8).
7. Replace rear evaporator chamber access panel (Figure 1, Item 2).
8. Reconnect ECU power supply cable (Figure 1, Item 1).
9. Verify that ECU power cable (Figure 1, Item 1) is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM

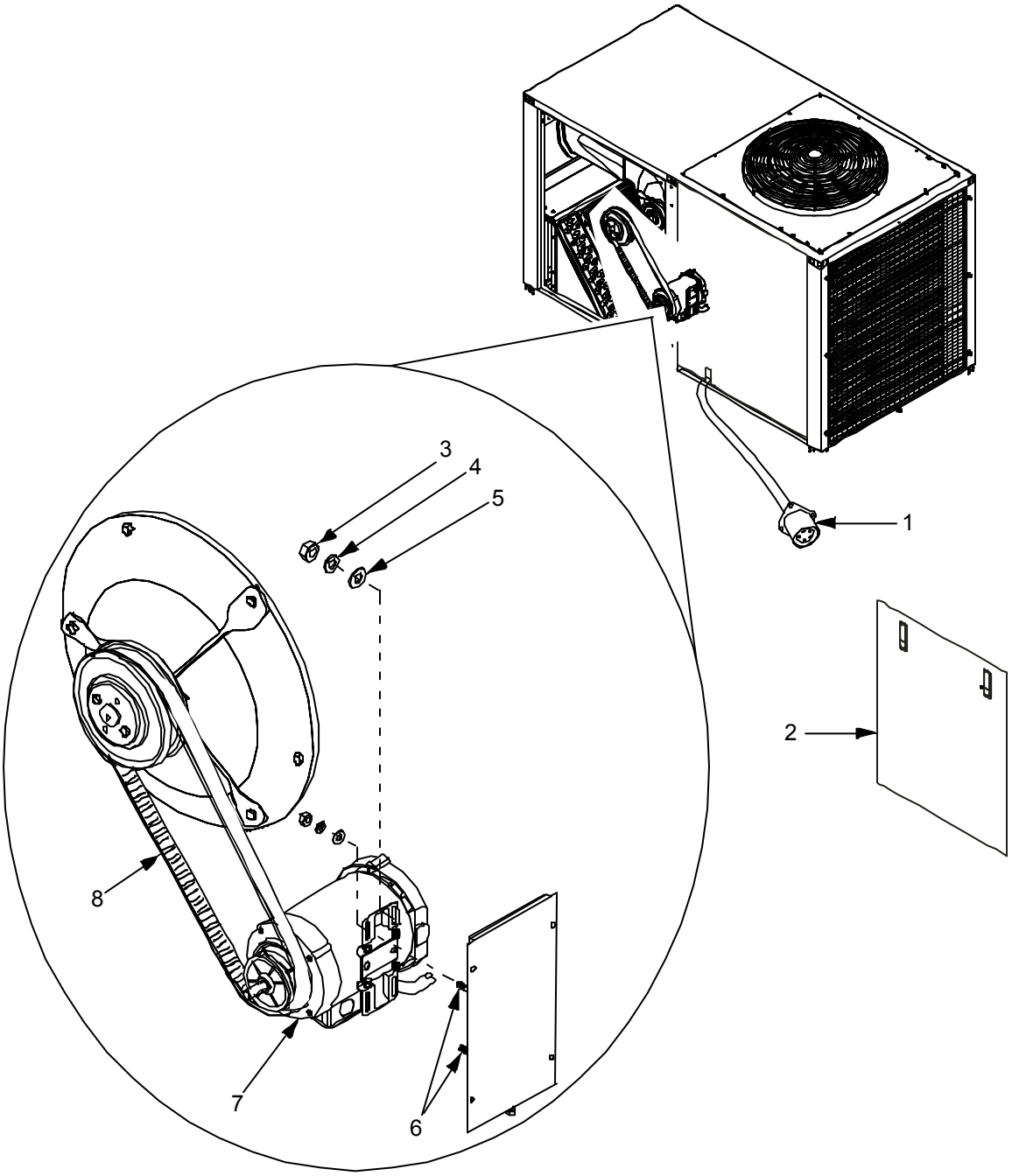


Figure 1. ECU Evaporator Motor Belt Adjustment.

END OF TASK

EVAPORATOR MOTOR BELT REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Belt, evaporator motor

Personnel Required
One

References
WP 0005

Equipment Condition
ECU shut down

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure, (WP 0005).
2. Unlatch and remove rear evaporator chamber access panel (Figure 2, Item 2). Set aside.

NOTE

When performing the following step, loosen but do not remove four mounting nuts (Figure 2, Item 3).

3. Loosen but do not remove four mounting nuts (Figure 2, Item 3), lock washers (Figure 2, Item 4), and flat washers (Figure 2, Item 5) on evaporator fan motor mounting studs (Figure 2, Item 6).
4. Push the evaporator fan motor (Figure 2, Item 7) upwards along the mounting studs (Figure 2, Item 6) to decrease tension on the evaporator motor belt (Figure 2, Item 9).
5. Slide evaporator motor belt (Figure 2, Item 9) off of evaporator motor pulley (Figure 2, Item 10) and motor pulley (Figure 2, Item 8).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following step inspect evaporator motor belt. Ensure that no visible damage is present.

1. Slide new evaporator motor belt (Figure 2, Item 9) over evaporator motor pulley (Figure 2, Item 10) and motor pulley (Figure 2, Item 8).
2. Push the evaporator fan motor (Figure 2, Item 7) upwards along the mounting studs (Figure 2, Item 6).
3. Slide the new evaporator motor belt (Figure 2, Item 9) over the motor pulley (Figure 2, Item 8).
4. Push the evaporator fan motor (Figure 2, Item 7) up along the mounting studs (Figure 2, Item 6).
5. Slide the evaporator motor belt (Figure 2, Item 9) over the pulley (Figure 2, Item 10) on the evaporator motor pulley (Figure 2, Item 8).

NOTE

When performing the following steps, deflection of evaporator motor belt (Figure 2, Item 9) should not be greater than one inch.

6. Move evaporator fan motor (Figure 2, Item 7) to make proper tension adjustment to evaporator motor belt (Figure 2, Item 9).
   - Down to increase the tension on the evaporator motor belt (Figure 2, Item 9).
   - Up to the decrease tension on the evaporator motor belt (Figure 2, Item 9).
7. Tighten four mounting nuts (Figure 2, Item 3), lock washers (Figure 2, Item 4), and flat washers (Figure 2, Item 5) on the evaporator fan motor mounting studs (Figure 2, Item 6).
8. Verify tension of evaporator motor belt (Figure 2, Item 9).
9. Replace rear evaporator chamber access panel (Figure 2, Item 2).
10. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

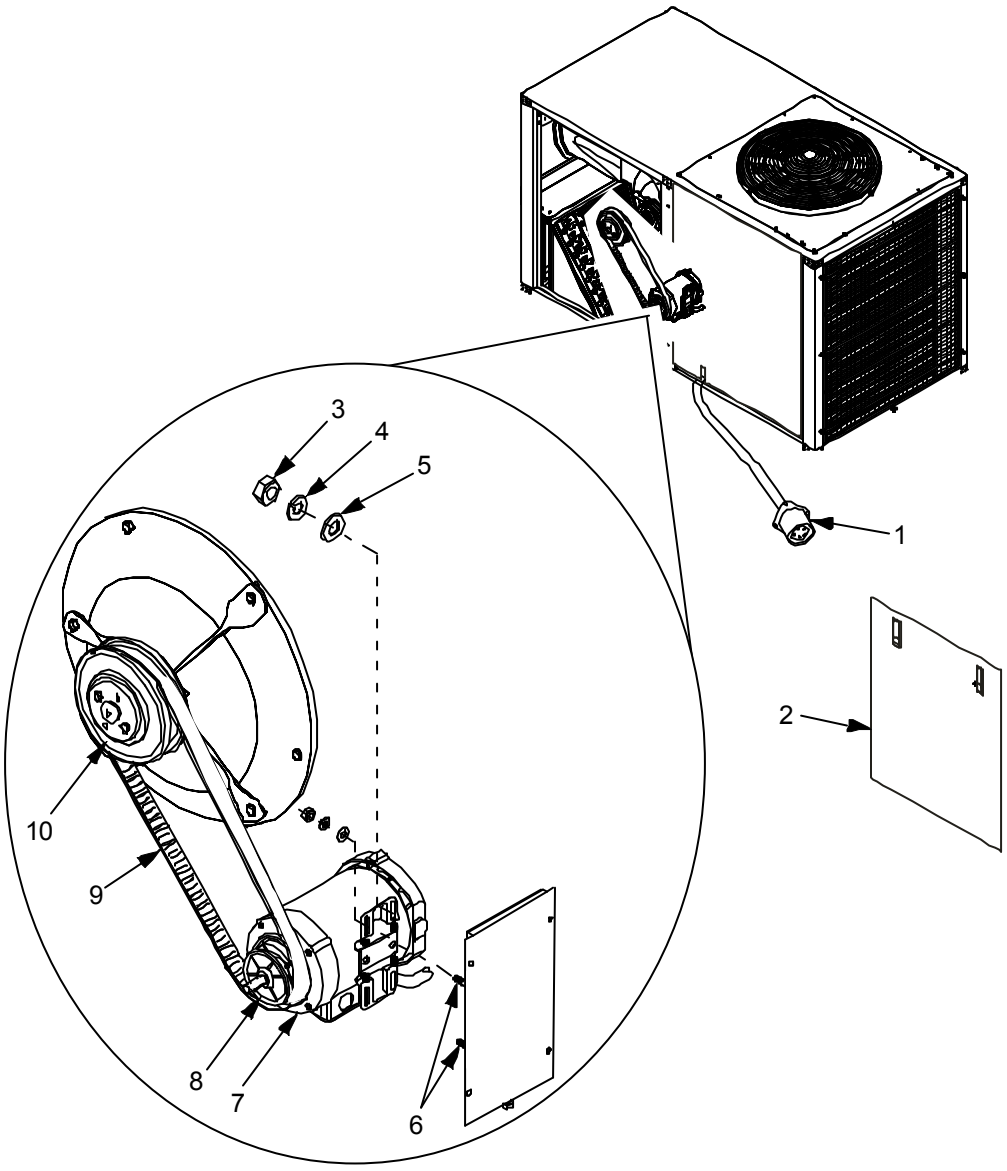


Figure 2. ECU Evaporator Motor Belt Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU – COMPRESSOR AND VIBRATION DAMPERS

GENERAL

This work package provides information on the removal and replacement of components on the ECU. They consist of:

- Compressor removal/replacement
- Vibration dampers removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

REFRIGERANT UNDER PRESSURE

Death or severe injury may result if you fail to observe safety precautions. Never use a heating torch on any part of the system that contains refrigerant. Do not let liquid refrigerant touch you, and do not inhale refrigerant gas.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figure FO-5) for refrigeration schematic and (Figure FO-1 through FO-4) for electrical schematics and wiring diagrams.

COMPRESSOR REMOVAL/REPLACEMENT

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Refrigeration service tool kit (WP 0165, Item 3)
Safety glasses/face shield
Gloves, rubber (WP 0168, Item 24)

Materials/Parts
Compressor
ECU Shut Down

Personnel Required
One

Reference
WP 0005, WP 0027, WP 0094, WP 0102, WP 0110, WP 0111, WP 0113, FO-1 through FO-5

Equipment Condition
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

WARNING

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.

2. Remove access panel from ECU and set aside.

CAUTION

Be cautious of thermostat wire, and all other electrical cables associated with the ECU control panel. Avoid damage to thermostat wire, and all other electrical cables associated with the ECU control panel.

3.Remove bracket that secures hydronic heater pump and filter. If necessary, refer to (WP 0094).

REMOVAL - Continued

4. Remove insulation (Figure 1, Item 2) from compressor (Figure 1, Item 3), vibration dampers (Figure 1, Item 13) and surrounding pipes to safely allow brazing.

5. Recover refrigerant as described in (WP 0113) of this TM.

6. Remove cover (Figure 1, Item 7) to allow access to electrical connections of compressor (Figure 1, Item 3).

7. Remove and retain nuts (Figure 1, Item 8) that secure electrical connections (T1, T2, T3 and ground) (Figure 1, Item 9) to compressor (Figure 1, Item 3). Remove electrical connections (T1, T2, T3 and ground) (Figure 1, Item 9) and loosely install hardware.

NOTE

When un-brazing vibration dampeners, de-solder on side furthest from compressor to avoid damage to vibration dampeners.

8. Un-braze vibration dampeners (Figure 1, Item 13). If necessary refer to (WP 0110) of this TM for brazing procedures.

9. Remove and retain four bolts (Figure 1, Item 11) and flat washers (Figure 1, Item 10) from base of compressor (Figure 1, Item 3).

10. Remove and retain four bolts (Figure 1, Item 4), flat washers (Figure 1, Item 5), and locking nuts (Figure 1, Item 6) from compressor mounting band (Figure 1, Item 12).

WARNING

HEAVY EQUIPMENT

Improperly lifting or carrying heavy equipment can result in serious injury or death. Refer to weight limits as outlined in front matter of this TM.

11. Remove compressor (Figure 1, Item 3) through opening on Genset side of ECU.

12. To prevent oil from spilling out of open lines, crimp and braze lines coming off of compressor (if necessary, refer to (WP 0110) of this TM).

END OF TASK

REPLACEMENT

WARNING

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

HEAVY EQUIPMENT

Improperly lifting or carrying heavy equipment can result in serious injury or death. Refer to weight limits as outlined in front matter of this TM.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to (WP 0027) for troubleshooting, (Figure FO-5) for refrigeration schematic and (Figure FO-1 through FO-4) for electrical schematics and wiring diagrams.

1. Install compressor (Figure 1, Item 3) through the area vacated when ECU control panel was removed.

2. Install compressor mounting band (Figure 1, Item 12). Loosely install four bolts (Figure 1, Item 4) through compressor mounting band (Figure 1, Item 12) and secure with flat washers (Figure 1, Item 5) and lock nuts (Figure 1, Item 6).

3. Loosely install four bolts (Figure 1, Item 11) and flat washers (Figure 1, Item 10) into base of compressor (Figure 1, Item 3) securing compressor (Figure 1, Item 3) to base of ECU.

4. Remove cover (Figure 1, Item 7) to allow access to electrical connections (Figure 1, Item 9) of compressor (Figure 1, Item 3).

5. Remove and retain nuts (Figure 1, Item 8) that secure electrical connections (Figure 1, Item 9) to compressor (Figure 1, Item 3). Install electrical connections (Figure 1, Item 9) (see Table 1) and install hardware.

Table 1. Compressor Connections.

FROM (Compressor)	TO (Compressor Contactor)	Wire #	Wire Color
T1	T1	24	Black
T2	T2	25	Red
T3	T3	26	White
Ground		11D	

6. Install vibration dampeners (Figure 1, Item 13) onto associated plumbing of compressor (Figure 1, Item 3) and braze vibration dampeners (Figure 1, Item 13) into place. If necessary refer to (WP 0110) of this TM for brazing procedures.

7. Replace filter/dryer as described in (WP 0102).

8. Leak test as described in (WP 0111) of this TM.

9. Charge system with 8.4 lbs. (3.18 Kg) of R-407c refrigerant as described in (WP 0113) of this TM.

REPLACEMENT - Continued

10. Install insulation (Figure 1, Item 2) onto compressor (Figure 1, Item 3) and surrounding pipes.
11. Install bracket that secures hydronic heater pump and filter. If necessary, refer to (WP 0094).
12. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

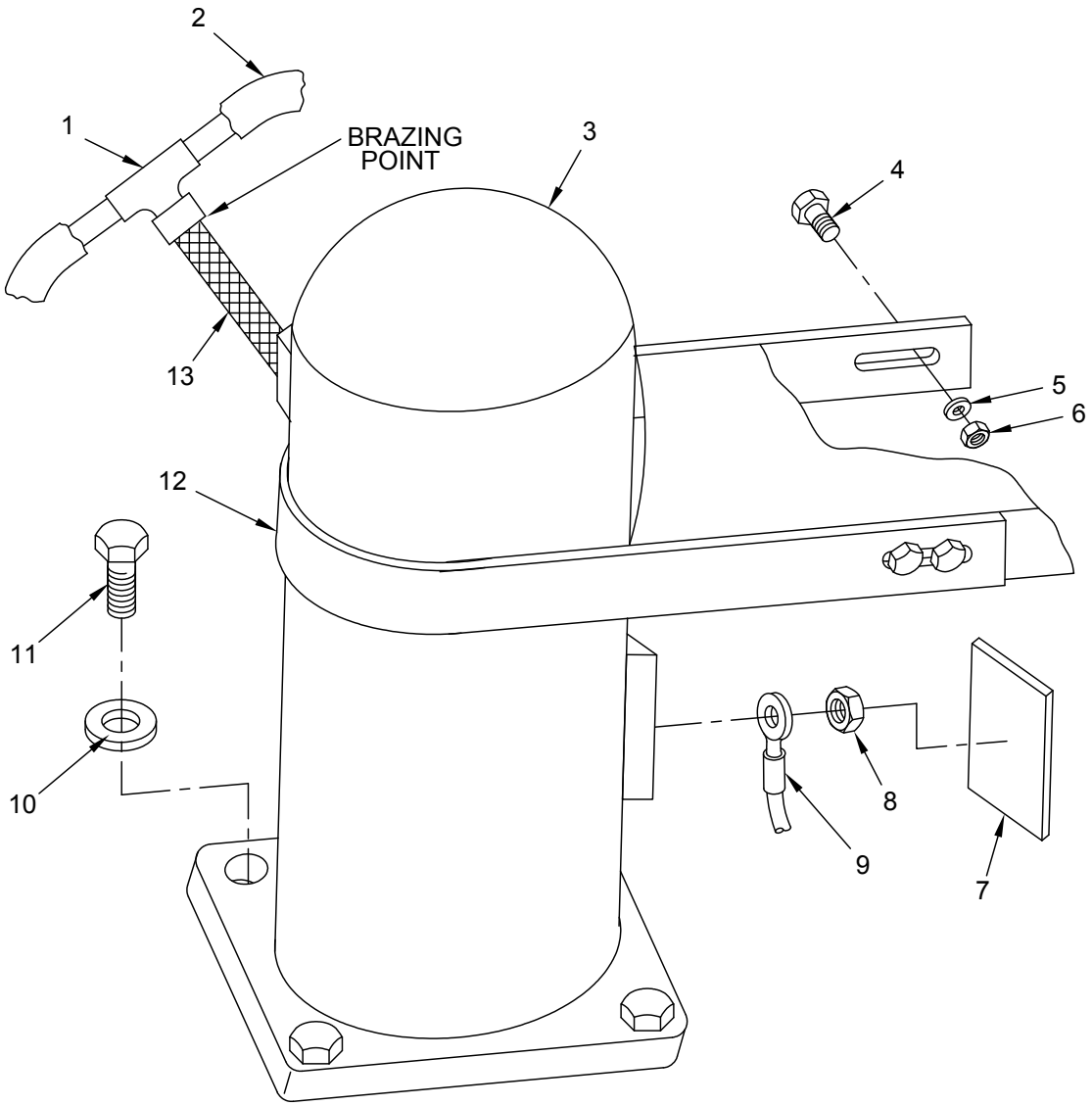


Figure 1. Compressor Removal/Replacement.

END OF TASK

VIBRATION DAMPER REMOVAL/REPLACEMENT

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Refrigeration service tool kit (WP 0165, Item 3)
Safety glasses/face shield
Gloves, rubber (WP 0168, Item 24)

Materials/Parts
Damper, Vibration

Personnel Required
One

Reference
WP 0005, WP 0027,
WP 0102, WP 0110,
WP 0111, WP 0113, FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable
disconnected from J1 on Genset

WARNING

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to (WP 0027) for troubleshooting, (Figure FO-5) for refrigeration schematic.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.

2. Remove access panel from ECU and set aside.

3. Remove insulation (Figure 1, Item 2) from vibration dampers (Figure 1, Item 13) and surrounding pipes to safely allow brazing.

4. Recover refrigerant as described in (WP 0113) of this TM.

REMOVAL - Continued

5. Un-braze vibration dampers (Figure 1, Item 13) and remove. If necessary refer to (WP 0110) of this TM for brazing procedures.

END OF TASK

REPLACEMENT

1. Install vibration dampers (Figure 1, Item 13) onto associated plumbing of compressor (Figure 1, Item 3) and braze vibration dampers (Figure 1, Item 13) into place. If necessary refer to (WP 0110) of this TM for brazing procedures.
2. Replace filter/dryer as described in (WP 0102).
3. Leak test as described in (WP 0110) of this TM.
4. Charge system with 8.4 lbs. (3.18 Kg) of R-407c refrigerant as described in (WP 0112) of this TM.
5. Install insulation (Figure 1, Item 2) onto compressor (Figure 1, Item 3) and surrounding pipes.
6. Replace access panel.
7. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU – VALVES

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Thermal expansion valve (TEV) removal/replacement/adjustment
- Quench valve removal/replacement
- Hot-gas bypass valve removal/replacement/adjustment
- High pressure relief removal/replacement
- Solenoid valve removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluid and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter must be replaced anytime there is a major component malfunction or the integrity of the system will be severely compromised.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figure FO-5) for refrigeration schematic and (Figure FO-1 through FO-5) for electrical schematics and wiring diagrams.

THERMAL EXPANSION VALVE (TEV) REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanics tool kit (WP 0165, Item 1)
Refrigeration service tool kit (WP 0165, Item 3)
Safety glasses/face shield
Gloves, rubber (WP 0168, Item 24)

Materials/Parts
Thermal expansion valve

Personnel Required
One

Reference
WP 0005, WP 0027, WP 0102, WP 0110, WP 0111, WP 0113, FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

WARNING

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter must be replaced anytime there is a major component malfunction or the integrity of the system will be severely compromised.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.

2. Remove access panel from ECU and set aside.

REMOVAL - Continued

3. Remove insulation (Figure 1, Item 1) from thermal expansion valve (Figure 1, Item 2), sensing bulb (Figure 1, Item 3), and surrounding pipes to safely allow brazing.

4. Recover refrigerant as described in (WP 0113) of this TM.

5. Wrap wet rag around thermal expansion valve (Figure 1, Item 2), distribution tube (Figure 1, Item 5), and capillary tubes (Figure 1, Item 4), to prevent damage from overheating.

6. Un-braze TEV (Figure 1, Item 2) at brazing points (see Figure 1). If necessary refer to (WP 0110) of this TM for brazing procedures.

7. Remove and retain any copper hose clamps securing sensing bulb (Figure 1, Item 3) to surrounding pipes

8. Remove TEV (Figure 1, Item 2), sensing bulb (Figure 1, Item 3) and associated tubing.

END OF TASK

REPLACEMENT

WARNING

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to (WP 0027) for troubleshooting, (Figure FO-5) for refrigeration schematic, and (Figure FO-1 through FO-4) for electrical schematics and wiring diagrams.

1. Install TEV (Figure 1, Item 2), sensing bulb (Figure 1, Item 3) and associated tubing.

2. Wrap wet rag around thermal expansion valve (Figure 1, Item 2), distribution tube (Figure 1, Item 5), and capillary tube (Figure 1, Item 4), to prevent damage from overheating.

3. Braze TEV at brazing points (see Figure 2). If necessary refer to (WP 0110) of this TM for brazing procedures.

4. Run sensing bulb (Figure 1, Item 3) to suction line of evaporator coil clamping into place as required with clamps removed earlier.

NOTE

Sensing bulb must be insulated to avoid thermal contamination from ambient air.

5. Install insulation (Figure 1, Item 1) onto sensing bulb (Figure 1, Item 3) and surrounding pipes.

6. Remove wet rag from around TEV (Figure 1, Item 2).

REPLACEMENT – Continued

7. Replace filter/dryer as described in (WP 0102).
8. Leak test as described in (WP 0111) of this TM.
9. Charge system with 8.4 lbs. (3.18 Kg) of R-407c refrigerant as described in (WP 0113) of this TM.
10. Replace access panel.
11. Perform adjustment procedure as described below.

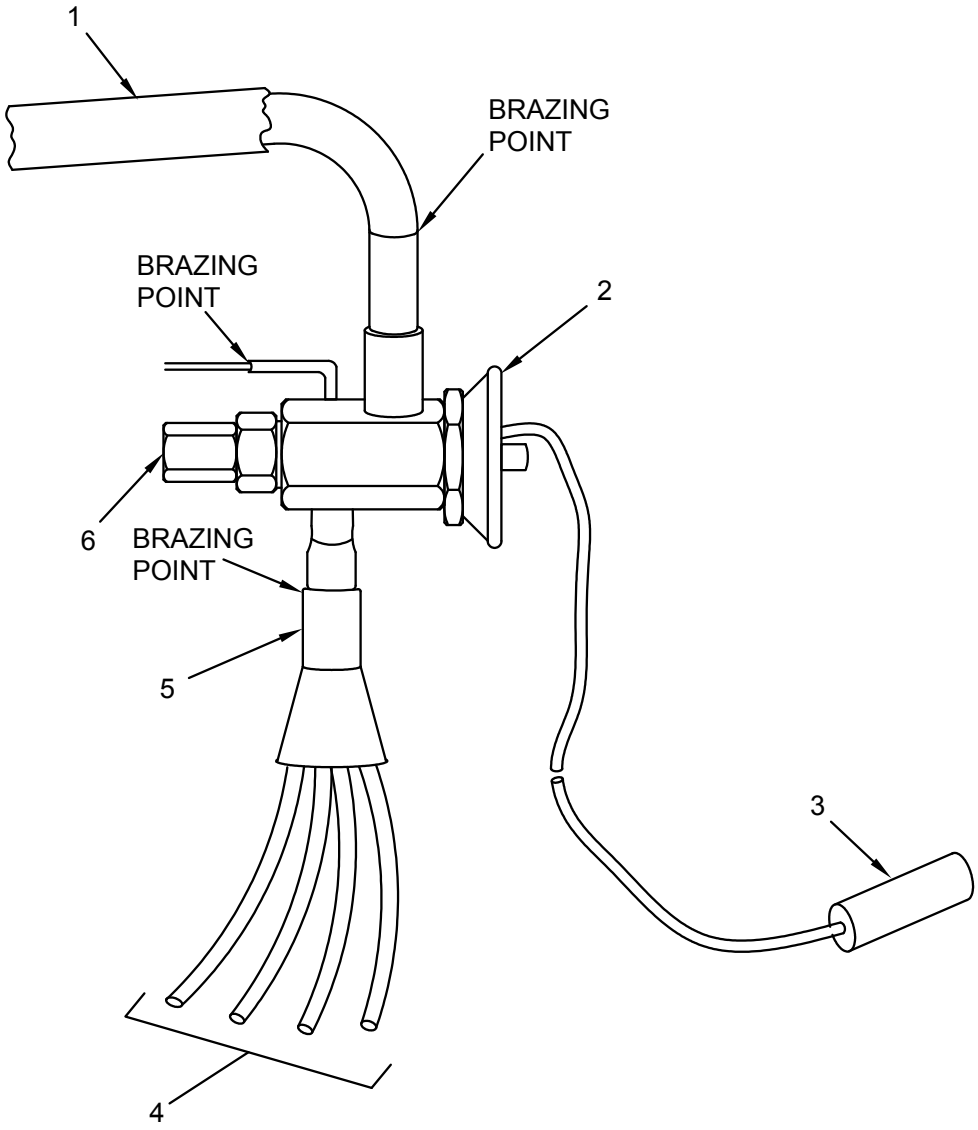


Figure 1. TEV Removal/Replacement.

END OF TASK

THERMAL EXPANSION VALVE SUPERHEAT ADJUSTMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Refrigeration service tool kit (WP 0165, Item 3)
Safety glasses/face shield
Gloves, rubber (WP 0168, Item 24)

Personnel Required
One

Reference
WP 0005

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

ADJUSTMENT

NOTE

Return (ambient) air must be above 70°F (21.11°C).

1. Verify that all access panels on ECU are properly installed.
2. Attach red gauge/line to LIQUID HIGH PRESSURE and blue gauge/line to SUCTION LOW PRESSURE.
3. Verify that all duct work or covers are properly installed.
4. Place thermocouple wire near expansion sensing bulb (Figure 1, Item 3) (near discharge of the evaporator coil) and secure into place with tape.
5. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.
6. Set MODE SELECT to COOL and adjust TEMPERATURE to 70°F (21.11°C) and allow unit to stabilize (approx. 30 min)

NOTE

R-407c has glide. Low pressure gauge will modulate, use mean pressure reading.

7. Read low pressure gauge and convert gauge pressure to temperature using dew point column on refrigerant chart for R-407c.
8. Subtract dew point temperature from the thermocouple temperature. The resulting temperature difference is the super heat value. The resultant (the super heat value) should be between 7 and 12.
9. If resultant is NOT between 7 and 12:
   a) Remove cap (Figure 1, Item 6) from end of TEV (Figure 1, Item 2).
   b) Hold nut on TEV with 7/8" wrench.
   c) If below 7, turn adjustment screw 1/2 turn clockwise.
   d) Above 12, turn adjustment screw 1/2 turn counter-clockwise.
   e) Allow system to stabilize (approx. 10 min.)
   f) Recalculate superheat as described in steps 7 and 8.

ADJUSTMENT - Continued

10. Replace cap (Figure 1, Item 6) on TEV (Figure 1, Item 2) and remove thermocouple wire.

11. Disconnect red gauge/line from LIQUID HIGH PRESSURE and blue gauge/line from SUCTION LOW PRESSURE and replace caps.

12. Replace access panel.

13. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

END OF TASK

QUENCH VALVE REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Refrigeration service tool kit (WP 0165, Item 3)
Safety glasses/face shield
Gloves, rubber (WP 0168, Item 24)

Materials/Parts
Quench valve

Personnel Required
One

Reference
WP 0005, WP 0027, WP 0102, WP 0110, WP 0111, WP 0113, FO-1 through FO 5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter must be replaced anytime there is a major component malfunction or the integrity of the system will be severely compromised.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.

2. Remove access panel from ECU and set aside.

REMOVAL - Continued

3. Remove insulation (Figure 2, Item 4) from quench valve (Figure 2, Item 1), sensing bulb (Figure 2, Item 3), and surrounding pipes to safely allow brazing.

4. Recover refrigerant as described in (WP 0113) of this TM.

5. Un-braze quench valve (Figure 2, Item 1) at brazing points (see Figure 2). If necessary refer to (WP 0110) of this TM for brazing procedures.

6. Remove and retain any copper hose clamps securing distribution tube (Figure 2, Item 2) and sensing bulb (Figure 2, Item 3) to surrounding pipes.

7. Remove quench valve (Figure 2, Item 1) distribution tube (Figure 2, Item 2) and sensing bulb (Figure 2, Item 3).

END OF TASK

REPLACEMENT

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to (WP 0027) for troubleshooting, (Figure FO-5) for refrigeration schematic, and (Figure FO-1 through FO-4) for electrical schematics and wiring diagrams.

1. Install quench valve (Figure 2, Item 1).

2. Wrap wet rag around quench valve (Figure 2, Item 1), distribution tube (Figure 2, Item 2), and sensing bulb (Figure 2, Item 3) to prevent damage from overheating.

3. Braze quench valve (Figure 2, Item 1) into place. If necessary refer to (WP 0110) of this TM for brazing procedures.

4. Run distribution tube (Figure 2, Item 2) and sensing bulb (Figure 2, Item 3) to suction line of evaporator coil clamping into place as required.

5. Install insulation (Figure 2, Item 4) onto sensing bulb (Figure 2, Item 3) and surrounding pipes.

6. Remove wet rag from around quench valve (Figure 2, Item 1).

7. Replace filter/dryer as described in (WP 0102).

8. Leak test as described in (WP 0111) of this TM.

REPLACEMENT – Continued

9. Charge system with 8.4 lbs. (3.18 Kg) of R-407c refrigerant as described in (WP 0113) of this TM.

10. Replace access panel.

11. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

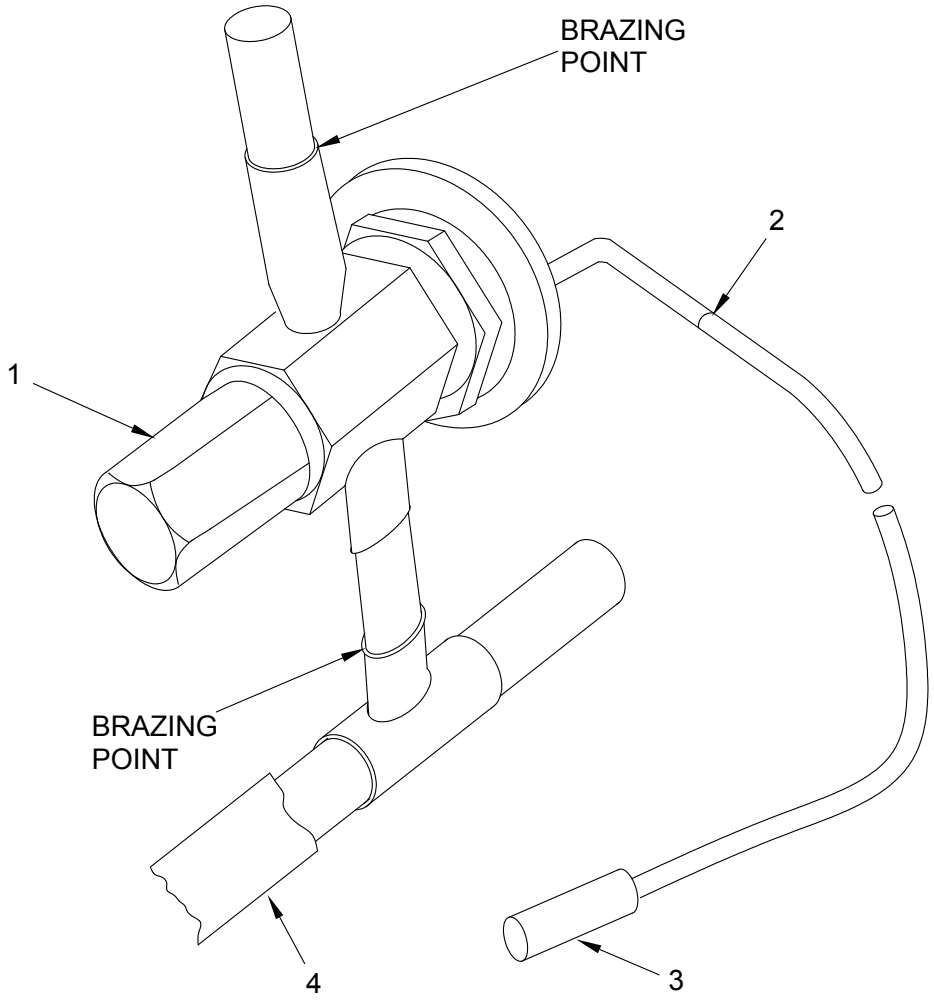


Figure 2. Quench Valve Removal/Replacement.

END OF TASK

HOT GAS BYPASS VALVE REMOVAL/REPLACEMENT/ADJUSTMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Refrigeration service tool kit (WP 0165, Item 3)
Safety glasses/face shield
Gloves, rubber (WP 0168, Item 24)

Materials/Parts
Hot gas by-pass valve

Personnel Required
One

Reference
WP 0005, WP 0027, WP 0102, WP 0110, WP 0111, WP 0113, FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter must be replaced anytime there is a major component malfunction or the integrity of the system will be severely compromised.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.

2. Remove access panel from ECU and set aside.

REMOVAL – Continued

3. Remove insulation (Figure 3, Item 3) from hot gas by-pass valve (Figure 3, Item 1), and surrounding pipes to safely allow brazing.

4. Recover refrigerant as described in (WP 0113) of this TM.

5. Un-braze hot gas by-pass valve (Figure 3, Item 1) at brazing points (see Figure 3). If necessary refer to (WP 0110) of this TM for brazing procedures.

6. Remove hot gas by-pass valve (Figure 3, Item 1).

END OF TASK

REPLACEMENT

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to (WP 0027) for troubleshooting, (Figure FO-5) for refrigeration schematic and (Figure FO-1 through FO-4) for electrical schematics and wiring diagrams.

1. Install hot gas by-pass valve (Figure 3, Item 1).

2. Braze hot gas by-pass (Figure 3, Item 1) into place. If necessary refer to (WP 0110) of this TM for brazing procedures.

3. Install insulation (Figure 3, Item 3) onto hot gas by-pass valve (Figure 3, Item 1) and surrounding pipes.

4. Replace filter/dryer as described in (WP 0102).

5. Leak test as described in (WP 0111) of this TM.

6. Charge system with 8.4 lbs. (3.18 Kg) of R-407c refrigerant as described in (WP 0113) of this TM.

7. Replace access panel.

8. Perform adjustment procedure as described below.

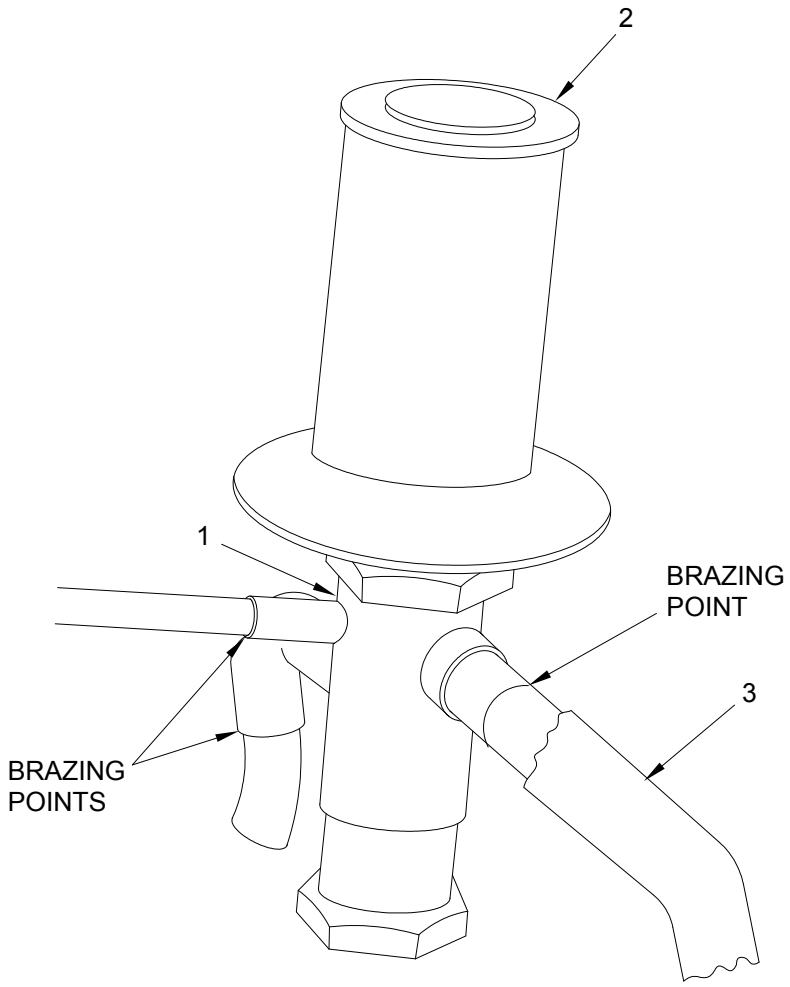


Figure 3. Hot Gas By-Pass Valve Removal/Replacement.

END OF TASK

ADJUSTMENT

1. Verify that all access panels on ECU are properly installed.

2. Attach red gauge/line to LIQUID HIGH PRESSURE and blue gauge/line to SUCTION LOW PRESSURE.

3. Verify that all duct work or covers are properly installed.

4. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

NOTE

Once the following step has been completed, an audible whistle should be coming from the hot-gas by-pass valve.

5. Set MODE SELECT to COOL and adjust TEMPERATURE to maximum setting (110°F) (43.33°C) Lo Pressure gauge should read 55 psig. If Lo pressure gauge does not read 55 psig:
   a) Remove cap (Figure 3, Item 2) from hot-gas by-pass valve
   b) If Lo pressure gauge reading is ABOVE 55 psig adjust screw 1/2 turn counter-clockwise.
   c) If Lo pressure gauge reading is BELOW 55 psig adjust screw 1/2 turn clockwise.
   d) Allow system to stabilize (apporx. 10 minutes) and read low pressure gauge. If necessary repeat until Lo pressure gauge reads 55 psig.

6. Replace cap (Figure 3, Item 2) on hot gas by-pass valve (Figure 3, Item 1).

7. Adjust TEMPERATURE to 72°F (22.22°C). If setting is below return air temperature, solenoid valve will close and audible whistle will stop, head pressure and suction pressure will increase.

8. Disconnect red gauge/line from LIQUID HIGH PRESSURE and blue gauge/line from SUCTION LOW PRESSURE and replace caps.

END OF TASK

HIGH PRESSURE RELIEF VALVE REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Refrigeration service tool kit (WP 0165, Item 3)
Safety glasses/face shield
Gloves, rubber (WP 0168, Item 24)

Materials/Parts
High pressure relief valve
Loc-tite (air conditioning grade) (WP 0165, Item 50)

Personnel Required
One

Reference
WP 0005, WP 0027, WP 0102,
WP 0111, WP 0113,
FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected
from J1 on Genset

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

CAUTION

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter must be replaced anytime there is a major component malfunction or the integrity of the system will be severely compromised.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access panel from ECU and set aside.
3. Recover refrigerant as described in (WP 0113) of this TM.
4. Remove any insulation from high pressure relief valve (Figure 4, Item 1). to allow removal.
5. Unscrew high pressure relief valve (Figure 4, Item 1) from plumbing joint (Figure 4, Item 2).

END OF TASK

REPLACEMENT

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to (WP 0027) for troubleshooting, (Figure FO-5) for refrigeration schematic and (Figure FO-1 through FO-4) for electrical schematics and wiring diagrams.

1. Coat threaded joint with refrigerant grade loc-tite.
2. Install high pressure relief valve (Figure 4, Item 1) into threaded plumbing joint (Figure 4, Item 2) and tighten.
3. Install any insulation removed to install high pressure relief valve (Figure 4, Item 1).
4. Replace filter/dryer as described in (WP 0102).
5. Leak test as described in (WP 0111) of this TM.
6. Charge system with 8.4 lbs. (3.18 Kg) of R-407c refrigerant as described in (WP 0113) of this TM.
7. Replace access panel.
8. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

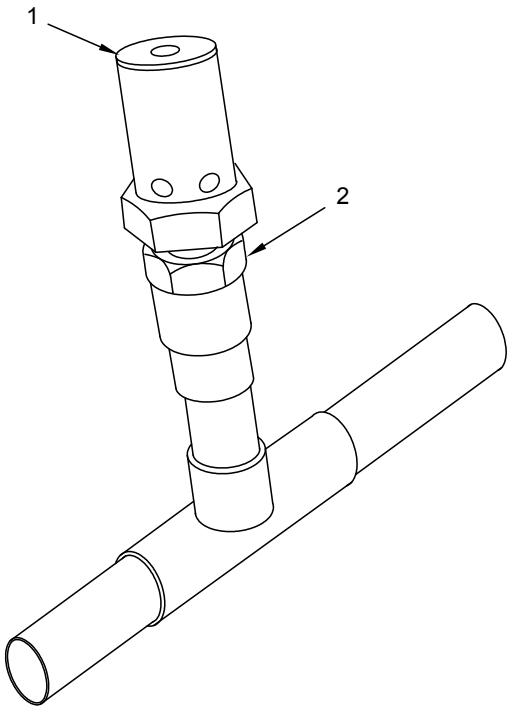


Figure 4. High Pressure Relief Valve Removal/Replacement.

END OF TASK

SOLENOID VALVE REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Refrigeration service tool kit (WP 0165, Item 3)
Safety glasses/face shield
Gloves, rubber (WP 0168, Item 24)

Materials/Parts
Solenoid valve

Personnel Required
One

Reference
WP 0005, WP 0027, WP 0102, WP 0110, WP 0111, WP 0113, FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter must be replaced anytime there is a major component malfunction or the integrity of the system will be severely compromised.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.

2. Remove access panel from ECU and set aside.

REMOVAL – Continued

3. Recover refrigerant as described in (WP 0113) of this TM.

4. Remove any insulation (Figure 5, Item 2) from solenoid valve (Figure 5, Item 1), and surrounding pipes to allow brazing.

5. Remove and retain four bolts that secure ECU control panel to frame.

CAUTION

When performing the following step, be observant of wires, cables and thermostat sense line being fed into the ECU control panel. Do not damage, equipment or components.

6. Remove ECU control panel and lay face down out of the way.

7. Remove power head (Figure 5, Item 3) from solenoid valve (Figure 5, Item 1).

8. Un-braze solenoid valve (Figure 5, Item 1) at brazing points (see Figure 5). If necessary refer to (WP 0110) of this TM for brazing procedures.

9. Mark and remove wires (33J and 42B) from power head (Figure 5, Item 3).

END OF TASK

REPLACEMENT

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to (WP 0027) for troubleshooting, (Figure FO-5) for refrigeration schematic and (Figure FO-1 through FO-4) for electrical schematics and wiring diagrams.

1. Connect wires (33J and 42B) to power head (Figure 5, Item 3).

2. Install solenoid valve (Figure 5, Item 1) and braze into place. If necessary refer to (WP 0110) of this TM for brazing procedures.

3. Install ECU control panel and secure with four bolts.

4. Replace filter/dryer as described in (WP 0102).

5. Leak test as described in (WP 0111) of this TM.

REPLACEMENT - Continued

6. Charge system with 8.4 lbs. (3.18 Kg) of R-407c refrigerant as described in (WP 0113) of this TM.
7. Install power head (Figure 5, Item 3) onto solenoid valve (Figure 5, Item 1).
8. Install any insulation onto solenoid valve (Figure 5, Item 2), and surrounding pipes.
9. Replace access panel.
10. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

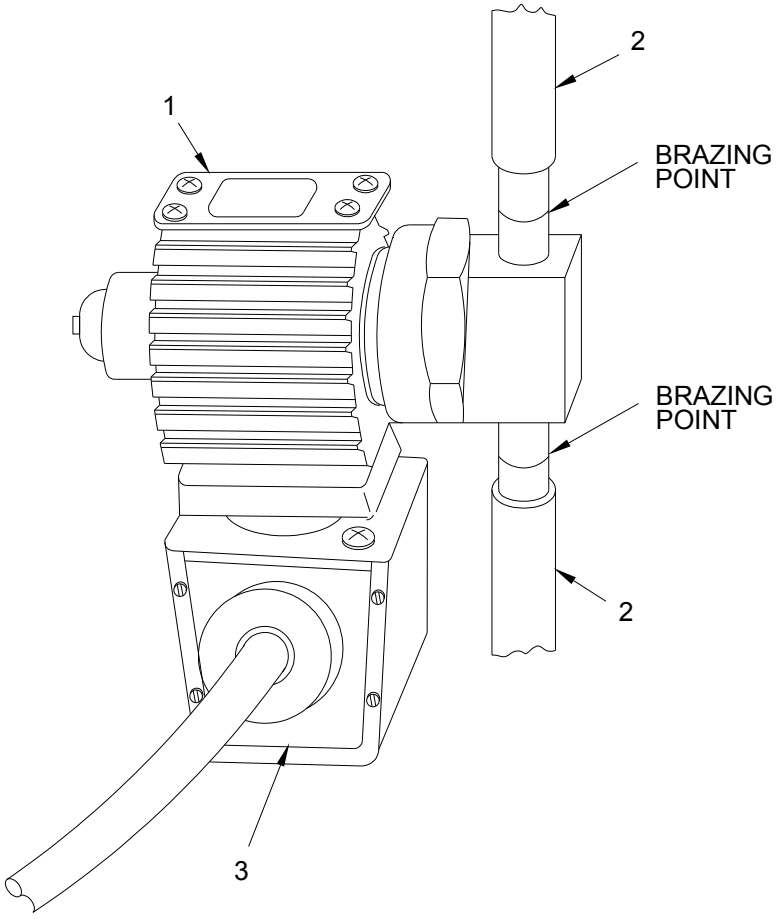


Figure 5. Solenoid Valve Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU AIR FILTER

GENERAL

This work package provides information on the inspection, cleaning, removal and replacement of the ECU air filter.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the ECU.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

AIR FILTER CLEANING/REMOVAL/REPLACEMENT

INITIAL SETUP:

Personnel Required
One

Equipment Condition
ECU shut down

References
WP 0005

REMOVAL

1. Verify that ECU (Figure 1, Item 1) has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Unlatch and remove forward and rear access panels (Figure 1, Items 2 and 4) from ECU.
3. Slide both ECU air filters (Figure 1, Item 3) out of holders.
4. Inspect air filters (Figure 1, Item 3) for cleanliness and general physical condition.
5. If dirty, clean with warm water and allow air filters (Figure 1, Item 3) to dry.

END OF TASK

REPLACEMENT

1. Slide both ECU air filters (Figure 1, Item 3) into holders inside of enclosure access panels.
2. Replace rear access panel (Figure 1, Item 2) and forward access panel (Figure 1, Item 2) to ECU and secure with latches.
3. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

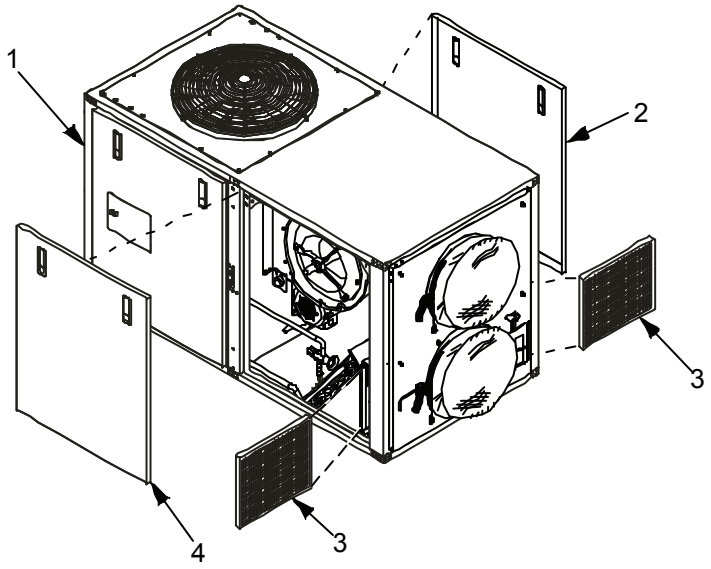


Figure 1. ECU Air Filter Locations.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU – FILTER/DRIER

GENERAL

This work package provides information on the removal and replacement of the filter/drier on the ECU used in the TMSS-MED.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

REFRIGERANT UNDER PRESSURE

Death or severe injury may result if you fail to observe safety precautions. Never use a heating torch on any part of the system that contains refrigerant. Do not let liquid refrigerant touch you, and do not inhale refrigerant gas.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

CAUTION

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter/dryer must be replaced anytime a non-electronic HVAC component is replaced.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figure FO-5) for refrigeration schematic and (Figure FO-1 through FO-4) for electrical schematics and wiring diagrams.

FILTER/DRIER REMOVAL/REPLACEMENT

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Refrigeration service tool kit (WP 0165, Item 3)
Safety glasses/face shield
Gloves, rubber (WP 0168, Item 24)

Materials/Parts
Filter/drier

Personnel Required
One

Reference
WP 0005, WP 0110,
WP 0111, WP 0113

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected
from J1 on Genset

WARNING

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.

2. Remove access panel from ECU and set aside.

3. Remove insulation (Figure 1, Item 1) from filter/drier (Figure 1, Item 2) and surrounding pipes to safely allow brazing.

4. Recover refrigerant as described in (WP 0113) of this TM.

5. Un-braze filter/drier (Figure 1, Item 2) at mounting joints (Figure 1, Item 3) as described in (WP 0110) of this TM and remove filter/drier (Figure 1, Item 2).

END OF TASK

REPLACEMENT

WARNING

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

1. Install filter/drier (Figure 1, Item 2) and braze mounting joints (Figure 1, Item 3) as described in (WP 0110) of this TM.
2. Leak test as described in (WP 0111) of this TM.
3. Charge system with 8.4 lbs. (3.18 Kg) of R-407c refrigerant as described in (WP 0113) of this TM.
4. Install insulation (Figure 1, Item 1) onto filter/drier (Figure 1, Item 2) and surrounding pipes.
5. Replace access panel.
6. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

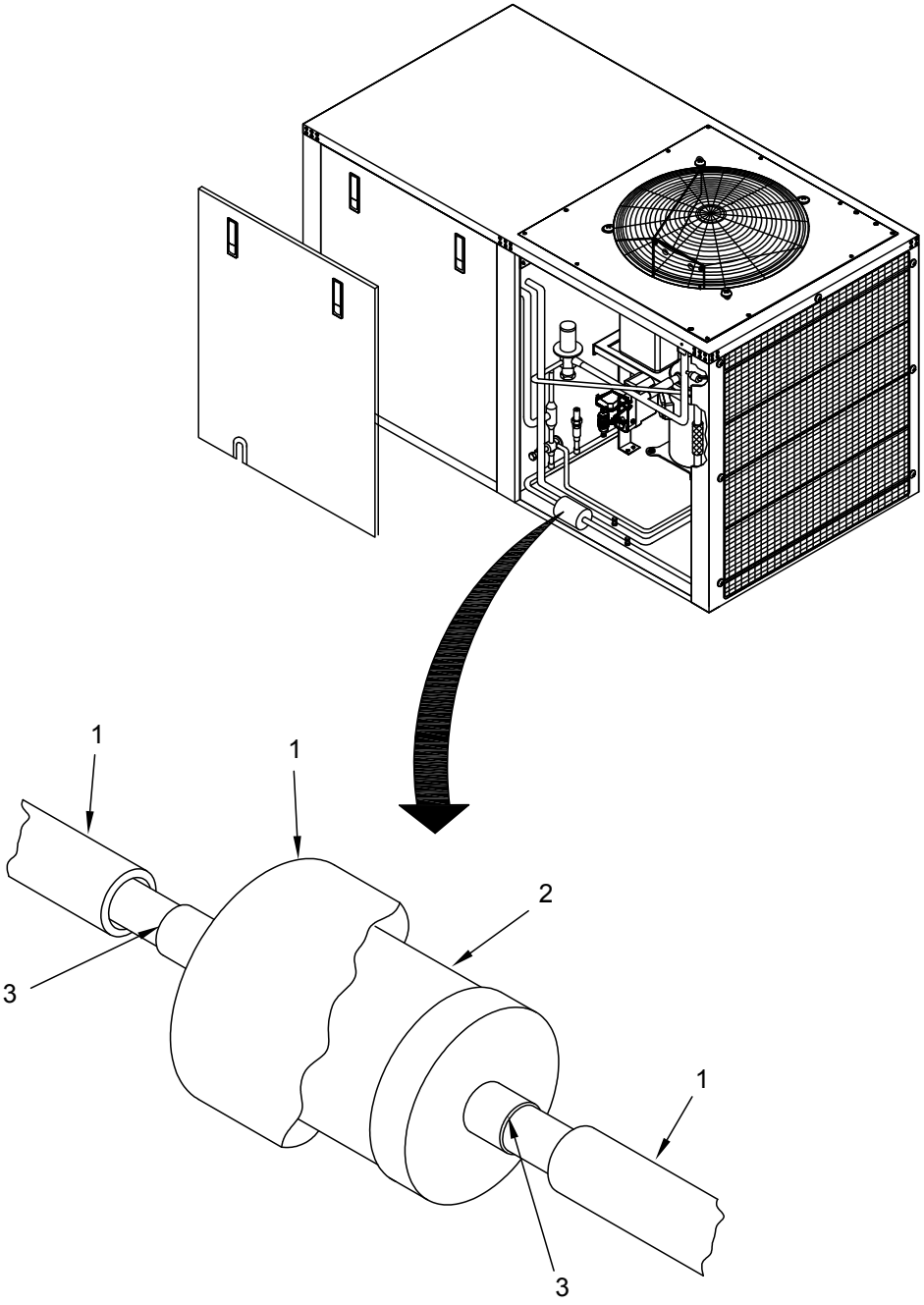


Figure 1. Filter/Drier Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU CONTROL PANEL DOOR

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- POWER ON light
- OUT OF PHASE light
- Hour Meter
- MODE SELECT Switch
- AUX Heat Switch
- Thermostat Assembly

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the ECU.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

NOTE

If necessary, refer to (WP 0027) for troubleshooting and (Figures FO-1 through FO-5) for schematics/wiring diagrams.

ECU CONTROL PANEL DOOR – LIGHTS and METER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
Hour Meter
Light sockets

Personnel Required
One

Reference
WP 0005, FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

POWER ON and OUT OF PHASE LIGHTS

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Turn lens cap (Figure 1, Item 9) counter clockwise to release and remove. Set aside.
4. Label each wire attached to lampholder (Figure 1, Item 5).
5. Loosen lock screws (Figure 1, Item 4) and remove wires from lampholder (Figure 1, Item 5).
6. Using flat tip screw driver press in on lampholder latch (Figure 1, Item 3) to release lampholder (Figure 1, Item 5) from panel socket (Figure 1, Item 8).
7. If replacing panel socket (Figure 1, Item 8) and panel socket fastener (Figure 1, Item 6), use a flat tip screw driver to pry panel socket fastener (Figure 1, Item 6) from control panel door (Figure 1, Item 7) and remove.

END OF TASK

REPLACEMENT

1. If replacing panel socket (Figure 1, Item 8) and panel socket fastener (Figure 1, Item 6), insert panel socket (Figure 1, Item 8) into control panel door (Figure 1, Item 7) and snap panel socket fastener (Figure 1, Item 6) onto end.
2. Position lampholder (Figure 1, Item 5) so that numbering on back is right side up.
3. Press lampholder (Figure 1, Item 5) into panel socket (Figure 1, Item 8) until it snaps into place.

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

REPLACEMENT – Continued

4. Connect wires to lampholder (Figure 1, Item 5) using lock screws (Figure 1, Item 4).
5. Install lens cap (Figure 1, Item 9). Ensure grooves and studs align and press cap in.
6. Turn lens cap (Figure 1, Item 9) clockwise to lock.
7. Close ECU control panel door and install access cover.
8. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

END OF TASK

HOUR METER

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Mark and disconnect wires from hour meter (Figure 1, Item 13).
4. Remove and retain two screws (Figure 1, Item 14), lock washers (Figure 1, Item 21) and nuts (Figure 1, Item 22) that secure hour meter (Figure 1, Item 13) to control panel (Figure 1, Item 7).
5. Remove hour meter (Figure 1, Item 13) from ECU control panel door (Figure 1, Item 7).

END OF TASK

REPLACEMENT

1. Insert hour meter (Figure 1, Item 13) into ECU control panel door (Figure 1, Item 7).
2. Secure to control panel door (Figure 1, Item 7) using two screws (Figure 1, Item 14), lock washers (Figure 1, Item 21) and nuts (Figure 1, Item 22).

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

3. Connect wires to hour meter (Figure 1, Item 13).
4. Close ECU control panel door and install access cover.
5. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

END OF TASK

ECU CONTROL PANEL DOOR – MODE SELECT SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
MODE SELECT Switch

Personnel Required
One

Reference
WP 0005, WP 0030,
FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected
from J1 on Genset

REMOVAL

NOTE

If necessary refer to (WP 0030) for test of the MODE SELECT switch.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Mark and disconnect wires from mode select switch (Figure 1, Item 1).
4. Loosen set screw (Figure 1, Item 12) and remove knob (Figure 1, Item 11) from mode select switch (Figure 1, Item 1).
5. Remove and retain nut (Figure 1, Item 10) from front of mode select switch (Figure 1, Item 1).
6. Remove mode select switch (Figure 1, Item 1) and washer (Figure 1, Item 2) from ECU control panel (Figure 1, Item 7).

END OF TASK

REPLACEMENT

1. Insert mode select switch (Figure 1, Item 1) and washer (Figure 1, Item 2) onto ECU control panel (Figure 1, Item 7) and loosely install nut (Figure 1, Item 10).

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

2. Secure wires to appropriate terminals on mode select switch (Figure 1, Item 1).
3. Properly position mode select switch (Figure 1, Item 1) onto ECU control panel (Figure 1, Item 7) and tighten nut (Figure 1, Item 10).

REPLACEMENT – Continued

4. Properly position knob (Figure 1, Item 11) onto mode select switch (Figure 1, Item 1). Tighten set screw (Figure 1, Item 12).

5. Close ECU control panel door and install access cover.

6. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

END OF TASK

ECU CONTROL PANEL DOOR – AUXILIARY HEAT SWITCH TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
Switch

Personnel Required
One

Reference
WP 0005
FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected
from J1 on Genset

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Ensure wires from auxiliary heat switches (Figure 1, Items 18 and 19) are properly marked.
4. Loosen lock screws (Figure 1, Item 20) and remove wiring.
5. Using flat tip screw driver press latch to release switch (Figure 1, Item 18 or 19) from bracket (Figure 1, Item 17).
6. If replacing auxiliary heat switch socket (Figure 1, Item 15) and panel socket fastener (Figure 1, Item 16), use a flat tip screw driver to pry panel socket fastener (Figure 1, Item 16) from control panel door (Figure 1, Item 7) and remove.

END OF TASK

REPLACEMENT

1. Insert auxiliary heat switch socket (Figure 1, Item 15) into ECU control panel (Figure 1, Item 7) and secure using panel socket fastener (Figure 1, Item 16).
2. Ensure bracket (Figure 1, Item 17) is properly positioned.
3. Position auxiliary heat switches (Figure 1, Items 18 and 19) so that numbering on back is right side up.
4. Press auxiliary heat switches (Figure 1, Items 18 and 19) into bracket (Figure 1, Item 17) until they snap into place.

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

5. Connect wires to auxiliary heat switches (Figure 1, Items 18 and 19) using lock screws (Figure 1, Item 20).

REPLACEMENT - Continued

6. Close ECU control panel door (Figure 1, Item 18) and install access cover (Figure 1, Item 1).

7. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

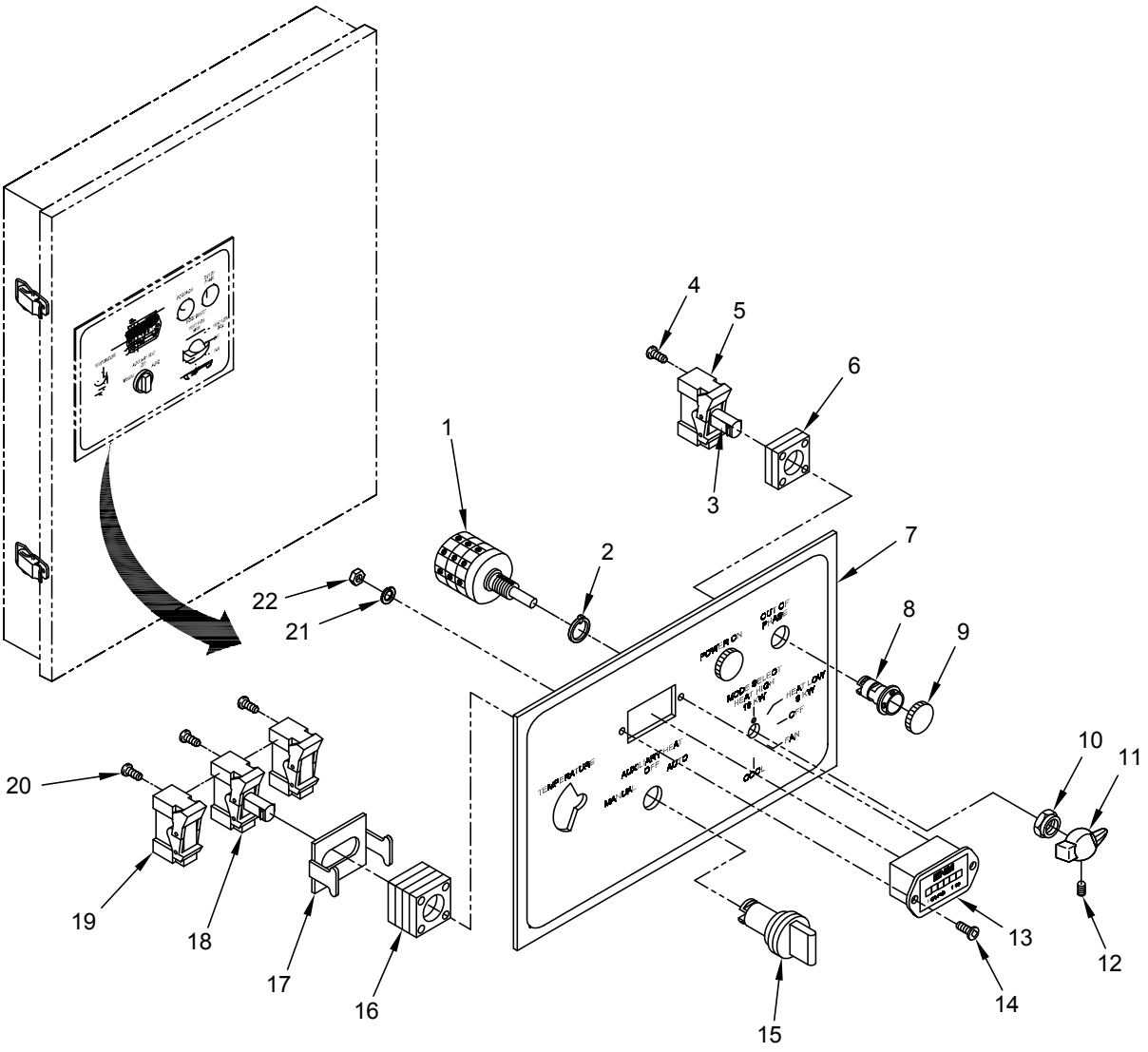


Figure 1. ECU Control Panel Faceplate Fluids and components Removal/Replacement.

END OF TASK

ECU CONTROL PANEL – THERMOSTAT TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 1)
Safety glasses

Materials/Parts
Thermostatic switch
Strap ties (WP 0168, Items 55 to 57)
Silicone sealant (RTV) (WP 0168, Item 51)

Personnel Required
One

Reference
WP 0005, WP 0030,
FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected
from J1 on Genset

REMOVAL

NOTE

If necessary refer to (WP 0030) for test of the thermostat.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.

2. Remove access cover and open ECU control panel door.

3. Remove and retain screw (Figure 2, Item 1) and cover (Figure 2, Item 2) from thermostat assembly (Figure 2, Item 4).

4. Verify that all electrical wires (Figure 2, Item 11) connected to thermostat (Figure 2, Item 4) are properly identified.

5. Remove and retain four terminal screws (Figure 2, Item 3) from thermostat (Figure 2, Item 4) and disconnect electrical wires (Figure 2, Item 11). Loosely install terminal screws (Figure 2, Item 3) back onto thermostat (Figure 2, Item 4).

6. Remove and retain ground terminal screw (Figure 2, Item 8) from thermostat (Figure 2, Item 4) and disconnect ground wire (Figure 2, Item 9). Loosely install ground terminal screw (Figure 2, Item 8) back into thermostat (Figure 2, Item 4).

7. Remove and retain four screws (Figure 2, Item 7) and washers (Figure 2, Item 6) that secure thermostat (Figure 2, Item 4) to control panel (Figure 2, Item 5).

8. Remove door seal from bottom right corner of control panel.

9. Follow sensor wire (Figure 2, Item 10) along control panel (Figure 2, Item 5) to feed through. Remove rubber grommet protecting sensor wire (Figure 2, Item 10). Slide sensor wire (Figure 2, Item 10) out of control panel (Figure 2, Item 5).

REMOVAL – Continued

10. Follow sensor wire (Figure 2, Item 10) through ECU, removing all strap ties and silicon sealant where applicable.

11. Carefully pull sensor wire (Figure 2, Item 10) through all ECU openings back to thermostat (Figure 2, Item 4) and remove thermostat (Figure 2, Item 4) and sensor wire (Figure 2, Item 10) from control panel (Figure 2, Item 5).

END OF TASK

REPLACEMENT

1. Install thermostat (Figure 2, Item 4) and sensor wire (Figure 2, Item 10) into control panel (Figure 2, Item 5) and secure using four screws (Figure 2, Item 7) and washers (Figure 2, Item 6).

2. If necessary, straighten out sensor wire (Figure 2, Item 10) and begin feeding through control panel (Figure 2, Item 5) and associated ECU feed throughs.

3. Install rubber grommet and door seal to bottom right corner of control panel.

4. Continue feeding sensor wire (Figure 2, Item 10) through ECU around evaporator chamber and blower chamber following same path sensor wire (Figure 2, Item 10) took when being removed.

5. Once sensor wire (Figure 2, Item 10) has been installed, wrap any remaining sensor wire (Figure 2, Item 10) around itself to temporarily secure in place.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

6. Where applicable strap tie sensor wire (Figure 2, Item 10) and apply silicone sealant to openings.

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

7. Connect electrical wires (Figure 2, Item 11) to thermostat (Figure 2, Item 4) using four terminal screws (Figure 2, Item 3).

8. Connect ground wire (Figure 2, Item 9) to thermostat (Figure 2, Item 4) using ground terminal screw (Figure 2, Item 8).

9. Mount cover (Figure 2, Item 2) onto thermostat assembly (Figure 2, Item 4) and secure with screw (Figure 2, Item 1).

10. Close ECU control panel door and install access cover.

11. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

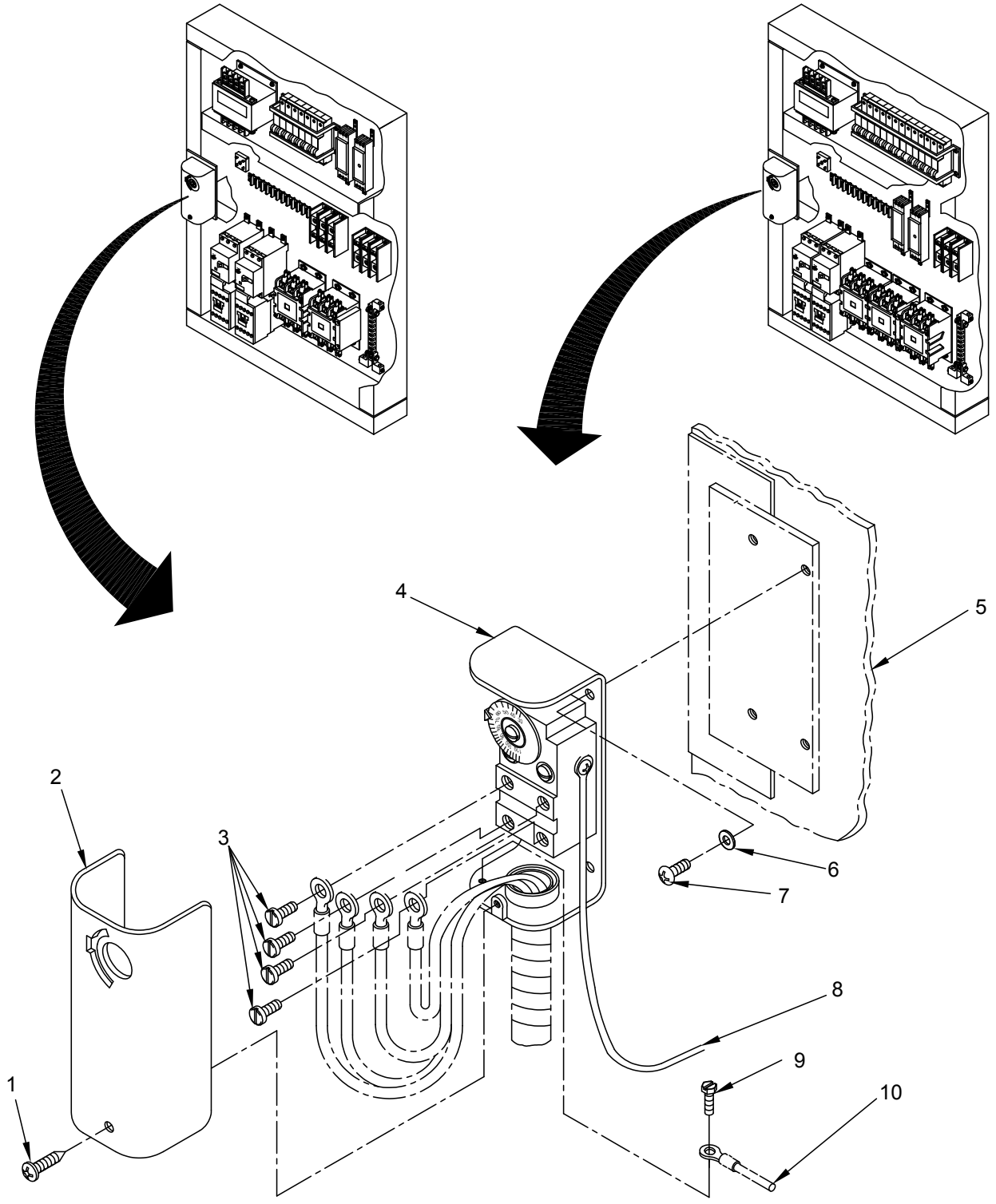


Figure 2. ECU Thermostat Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU CONTROL PANEL – CIRCUIT BREAKERS

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Circuit breaker (CB1)
- Circuit breaker (CB2)
- Circuit breaker (CB3)
- Circuit breaker (CB4) (Version 2)
- Circuit breaker (CB5) (Version 2)

WARNING

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present at the PDP. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

The following procedures apply to all circuit breakers listed in the beginning of this WP. Where applicable differences between Version 1 and Version 2 control panels will be noted.

If necessary, refer to (WP 0027) for troubleshooting and)Figures FO-1 through FO-5) for schematics/wiring diagrams.

ECU CONTROL PANEL (DOOR) COMPONENTS REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
Circuit breaker(s)

Personnel Required
One

Reference
WP 0005, WP 0030,
FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable
disconnected from J1 on Genset

REMOVAL

NOTE

If necessary refer to (WP 0030) for test of the circuit breakers.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 1, Item 7) connected to circuit breaker (Figure 1, Item 3) being replaced are properly identified.
4. Loosen but do not remove terminal screws (Figure 1, Item 6) securing electrical wires (Figure 1, Item 7) to circuit breaker (Figure 1, Item 3). Remove electrical wires (Figure 1, Item 7) from circuit breaker(s) (Figure 1, Item 3).
5. Remove and retain four screws (Figure 1, Item 1) that secure hold down clamp (Figure 1, Item 8) to control panel (Figure 1, Item 4) remove hold down clamp (Figure 1, Item 8).
6. Pull out grey hold down tabs (Figure 1, Item 2) located on top and bottom of circuit breaker (Figure 1, Item 3) and pull circuit breaker (Figure 1, Item 3) away from mounting bracket (Figure 1, Item 5).

END OF TASK

REPLACEMENT

1. Pull out grey hold down tabs (Figure 1, Item 2) located on top and bottom of circuit breaker (Figure 1, Item 3).
2. Insert circuit breaker (Figure 1, Item 3) onto mounting bracket (Figure 1, Item 5) and close grey hold down tabs (Figure 1, Item 2).

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

3. Loosen but do not remove terminal screws (Figure 1, Item 6). Insert electrical wires (Figure 1, Item 7) into circuit breaker(s) (Figure 1, Item 3) and tighten terminal screws (Figure 1, Item 6).

REPLACEMENT – Continued

4. Install hold down clamp (Figure 1, Item 8) across circuit breakers (Figure 1, Item 3). Secure to control panel (Figure 1, Item 4) using four screws (Figure 1, Item 1).

5. Close ECU control panel door and install access cover.

6. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

NOTE

If necessary, refer to Figures (FO-1 through FO-5) for schematics/wiring diagrams.

Table 1. Circuit Breaker Connections/Wire ID Numbers.

VERSION 1					VERSION 2			
CIRCUIT BREAKER	**AMPS**	**INPUT**	**OUTPUT**		**CIRCUIT BREAKER**	**AMPS**	**INPUT**	**OUTPUT**
CB1	5 Amp	32	34A		CB1	5 Amp	32	34A
CB2	1.6 Amp	12D	30A		CB2	1.6 Amp	12F	30A
		13D	31A				13F	31A
		14D	32A				14F	10
CB3	63 Amp	12C	21A		CB3	32 Amp	12C	21A
		13C	22A				13C	22A
		14C	23A				14C	23A
					CB4	32 Amp	12D	21B
							13D	22B
							14D	23B
					CB5	32 Amp	12E	21C
							13E	22C
							14E	23C

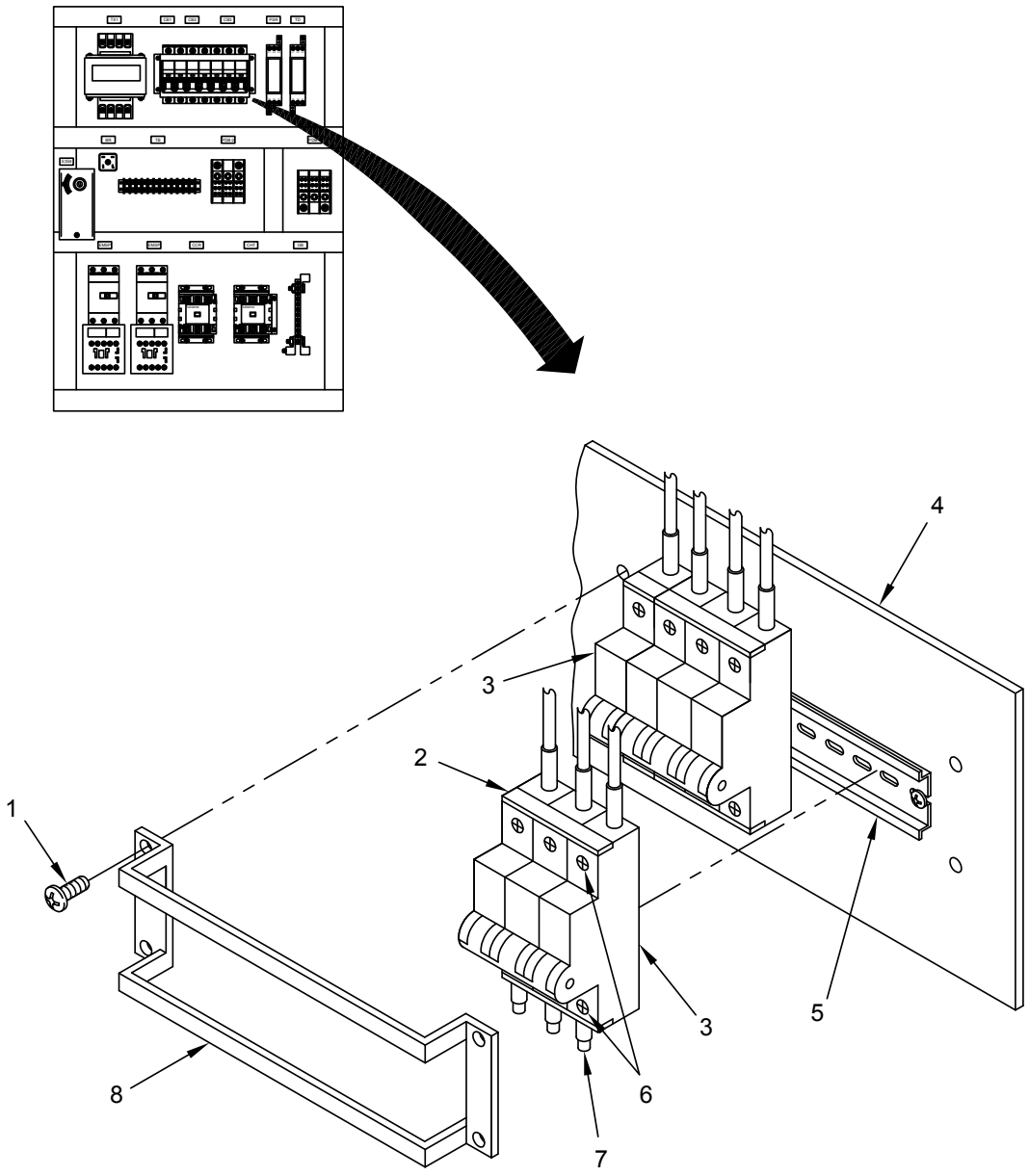


Figure 1. Circuit Breaker Removal/Replacement (Version 1).

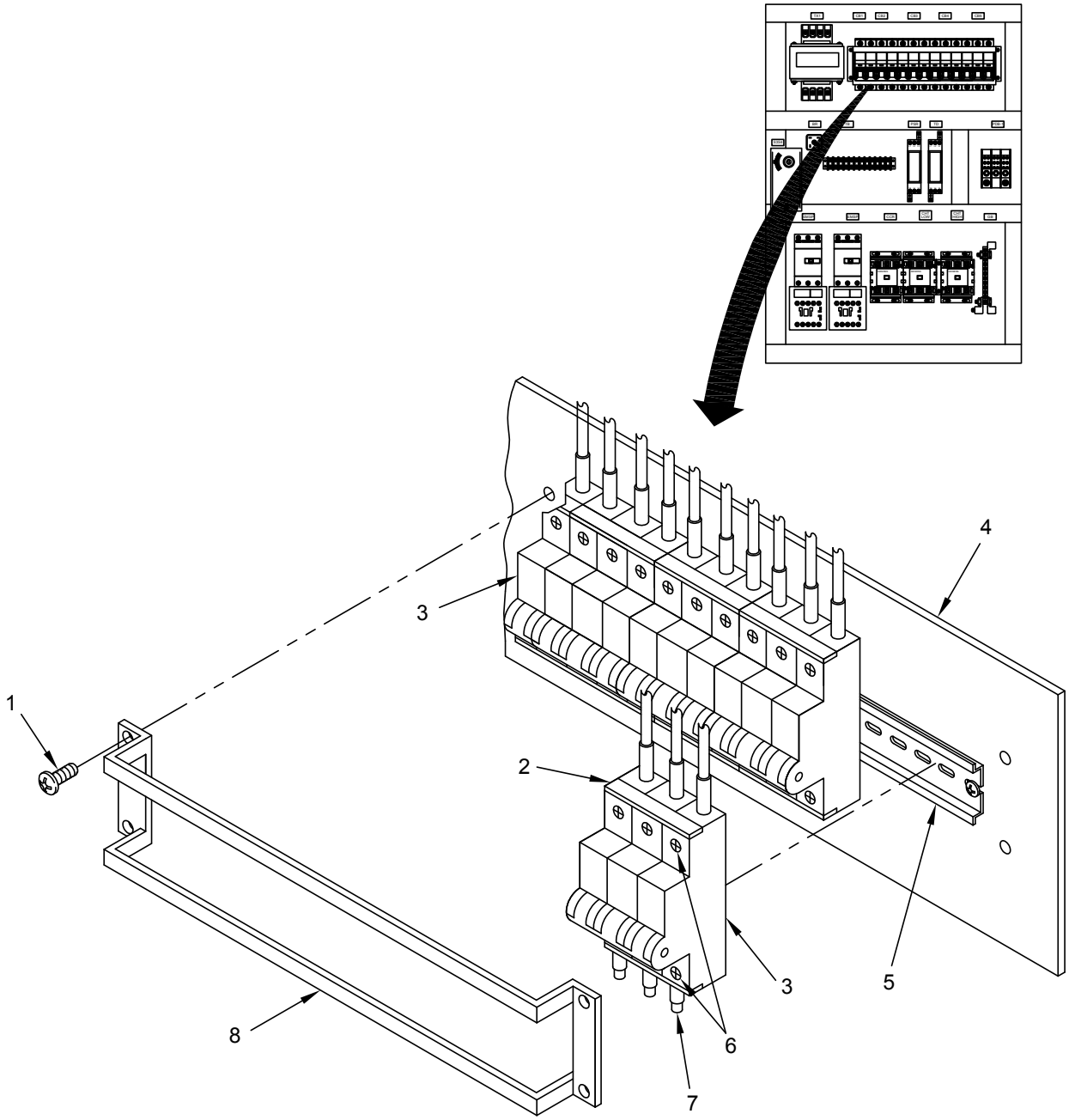


Figure 2. Circuit Breaker Removal/Replacement (Version 2).

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU CONTROL PANEL – CONTACTORS

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Heater contactor (CHT) (Version 1)
- Heater contactor low (CHT LOW) (Version 2)
- Heater contactor high (CHT HI) (Version 2)
- Compressor contactor (CCR)

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure cage bolts are not inserted and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present at the PDP. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

The following procedures apply to all contactors listed in the beginning of this WP. Where applicable differences between Version 1 and Version 2 control panels will be noted.

If necessary, refer to (WP 0027) for troubleshooting and (Figures FO-1 through FO-5) for schematics/wiring diagrams.

ECU CONTROL PANEL CONTACTORS TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
Contactors

Personnel Required
One

Reference
WP 0005, WP 0030,
FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected
from J1 on Genset

REMOVAL

NOTE

If necessary refer to (WP 0030) for test of the contactors.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 1, Item 5) connected to contactor being replaced are properly identified.
4. Loosen but do not remove terminal screws (Figure 1, Item 6) securing all electrical wires (Figure 1, Item 5) to contactor (Figure 1, Item 1) being replaced. Remove electrical wires (Figure 1, Item 5) from contactor (Figure 1, Item 1).
5. Remove and retain four screws (Figure 1, Item 4) that secure bracket (Figure 1, Item 2) to control panel (Figure 1, Item 3).
6. Remove contactor (Figure 1, Item 1) from control panel (Figure 1, Item 3).

END OF TASK

REPLACEMENT

1. Install contactor (Figure 1, Item 1) onto control panel (Figure 1, Item 3).
2. Secure bracket (Figure 1, Item 2) to control panel (Figure 1, Item 3) with four screws (Figure 1, Item 4).
3. Inspect all electrical wires (Figure 1, Item 5) being connected. Ensure no physical damage is present. If necessary, repair or replace.

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

4. Loosen but do not remove terminal screws (Figure 1, Item 6) on contactor (Figure 1, Item 1). Install all electrical wires (Figure 1, Item 5) and tighten terminal screws (Figure 1, Item 6).

REPLACEMENT – Continued

5. Close ECU control panel door and install access cover

6. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

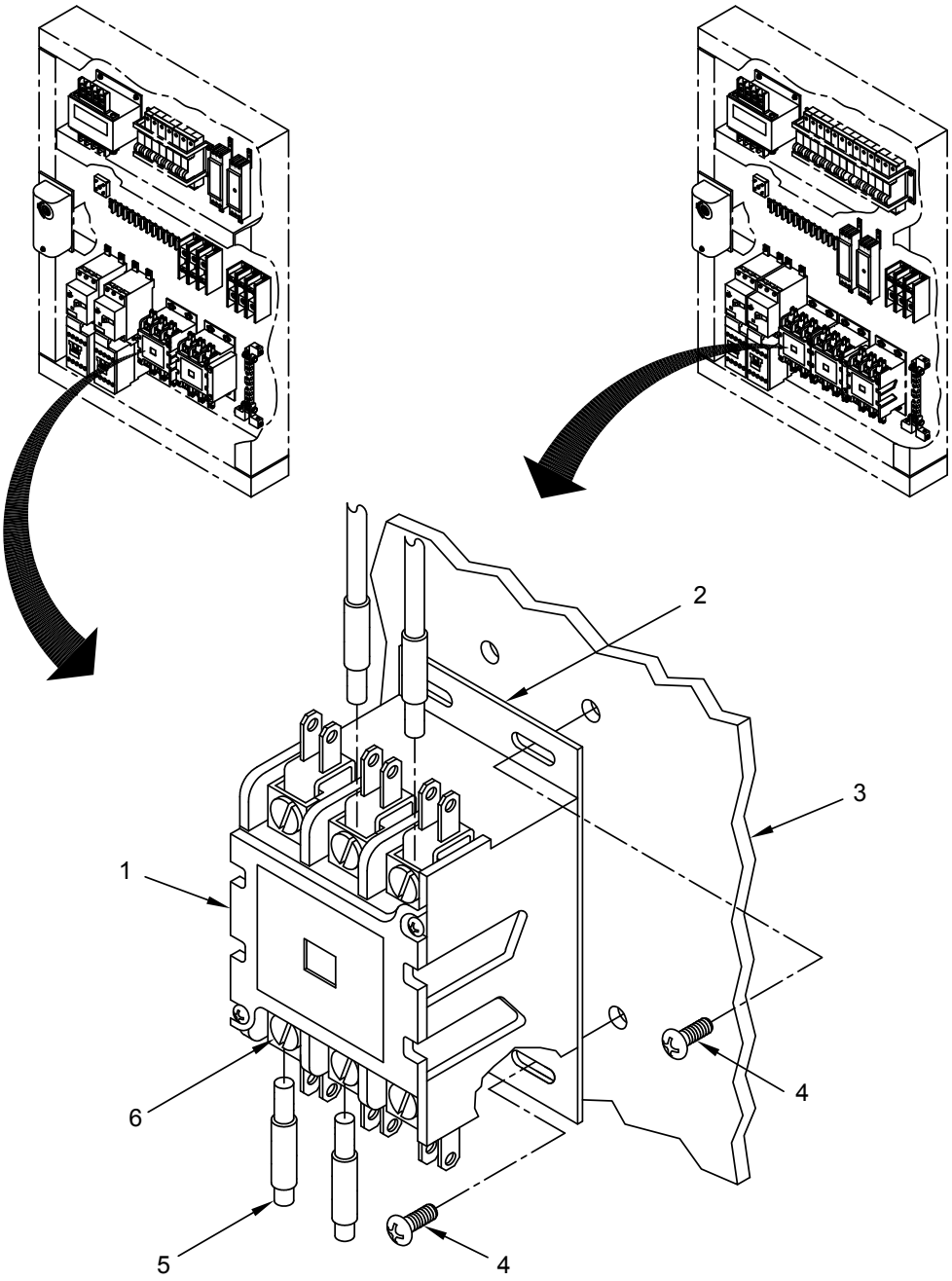


Figure 1. Contactor Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU CONTROL PANEL – RELAYS

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Phase sense relay (PSR)
- Time Delay Relay (TD)

WARNING

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present at the PDP. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

The following procedures apply to all relays listed in the beginning of this WP. Where applicable differences between Version 1 and Version 2 control panels will be noted.

ECU CONTROL PANEL RELAYS REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
Relay

Personnel Required
One

Reference
WP 0005, WP 0030,
FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable
disconnected from J1 on Genset

REMOVAL

NOTE

If necessary refer to (WP 0030) for test of the relays.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 1, Item 4) connected to relay being replaced are properly identified.
4. Loosen but do not remove terminal screws (Figure 1, Item 5) securing electrical wires (Figure 1, Item 4) to relay (Figure 1, Item 2). Remove electrical wires (Figure 1, Item 4) from relay (Figure 1, Item 2).
5. Remove and retain two screws (Figure 1, Item 1) that secure relay (Figure 1, Item 2) to control panel (Figure 1, Item 3) and remove relay (Figure 1, Item 2).

END OF TASK

REPLACEMENT

1. Install relay (Figure 1, Item 2) onto control panel (Figure 1, Item 3) and secure using two screws (Figure 1, Item 1).
2. Inspect all electrical wires (Figure 1, Item 4) being connected. Ensure no physical damage is present. If necessary, repair or replace.

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

3. Loosen but do not remove terminal screws (Figure 1, Item 5) on relay (Figure 1, Item 2). Install all electrical wires (Figure 1, Item 4) and tighten terminal screws (Figure 1, Item 5).

.

REPLACEMENT – Continued

4. Close ECU control panel door and install access cover.

5. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

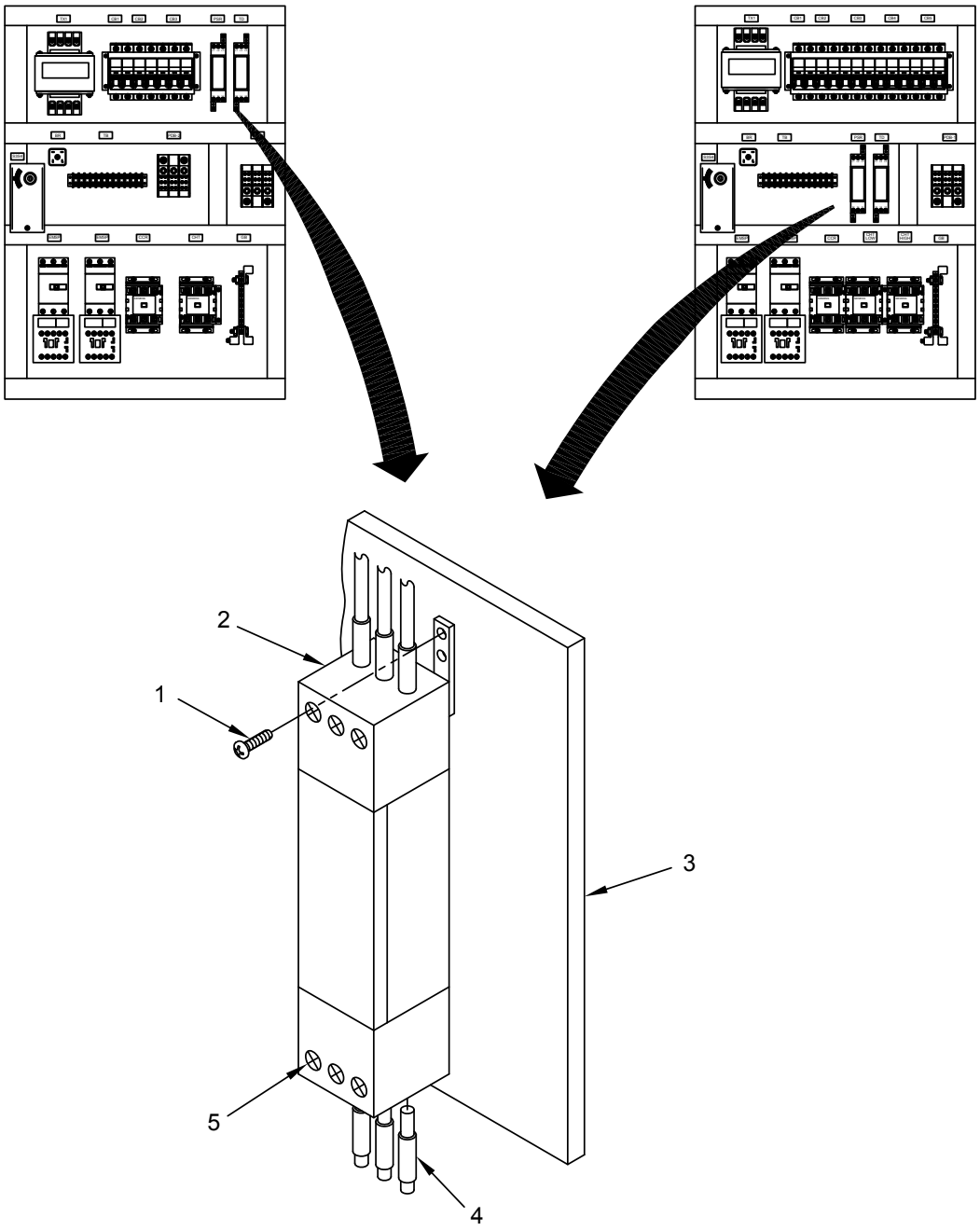


Figure 1. Relay Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU CONTROL PANEL – TRANSFORMER AND BRIDGE RECTIFIER

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Transformer, step-down (TX1)
- Bridge rectifier (BR)

WARNING

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present at the PDP. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

The following procedures apply to all relays listed in the beginning of this WP. Where applicable differences between Version 1 and Version 2 control panels will be noted.

If necessary, refer to (WP 0027) for troubleshooting and (Figures FO-1 through FO-5) for schematics/wiring diagrams.

ECU CONTROL PANEL TRANSFORMER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
Transformer

Personnel Required
One

Reference
WP 0005, WP 0030,
Figure FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected
from J1 on Genset

REMOVAL

NOTE

If necessary refer to (WP 0030) for test of the transformer.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure, (WP 0005), CB1 on Genset is shut down and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 1, Item 1) connected to transformer (Figure 1, Item 4) are properly identified.
4. Remove and retain terminal screws (Figure 1, Item 5) securing electrical wires (Figure 1, Item 1) to transformer (Figure 1, Item 4). Remove electrical wires (Figure 1, Item 1) away from transformer (Figure 1, Item 4).
5. Remove and retain four screws (Figure 1, Item 3) that secure transformer (Figure 1, Item 4) to control panel (Figure 1, Item 2).
6. Remove transformer (Figure 1, Item 4) and set aside.

END OF TASK

REPLACEMENT

1. Install transformer (Figure 1, Item 4) onto control panel (Figure 1, Item 2) and secure using four screws (Figure 1, Item 3).
2. Inspect all electrical wires (Figure 1, Item 1) being connected. Ensure no physical damage is present. If necessary, repair or replace.

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

REPLACEMENT – Continued

3. Remove terminal screws (Figure 1, Item 5) from transformer (Figure 1, Item 4). Connect all electrical wires (Figure 1, Item 1) and install terminal screws (Figure 1, Item 5).

4. Close ECU control panel door and install access cover.

5. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

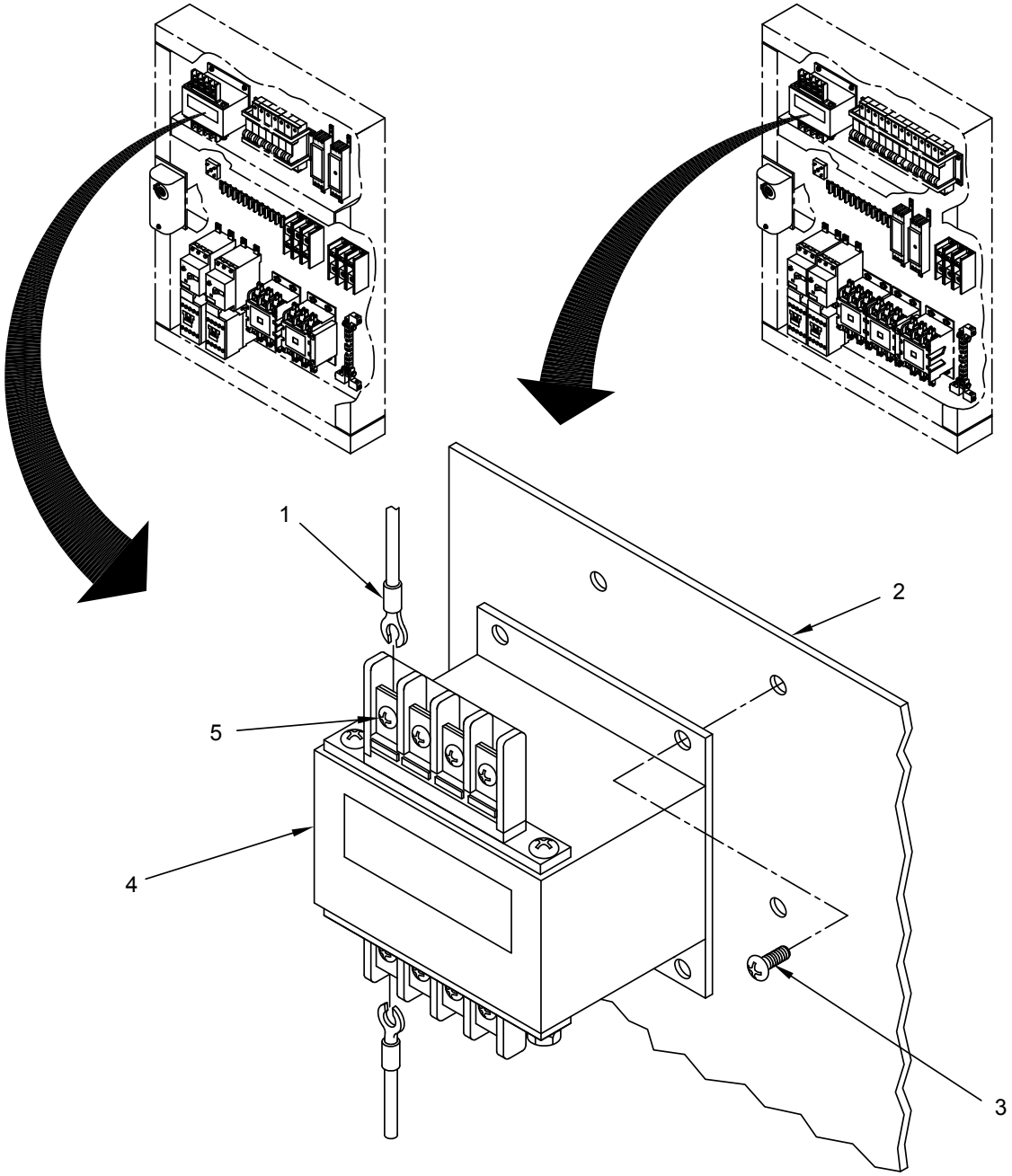


Figure 1. Transformer Removal/Replacement.

END OF TASK

ECU CONTROL PANEL BRIDGE RECTIFIER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
Bridge rectifier

Personnel Required
One

Reference
WP 0005, WP 0030,
Figure FO-1 through FO-5

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected
from J1 on Genset

REMOVAL

NOTE

If necessary refer to (WP 0030) for test of the bridge rectifier.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 2, Item 5) connected to bridge rectifier (Figure 2, Item 1) are properly identified.
4. Disconnect electrical wires (Figure 2, Item 5) from bridge rectifier (Figure 2, Item 1).
5. Remove and retain screw (Figure 2, Item 4) and flat washer (Figure 2, Item 3) that secure bridge rectifier (Figure 2, Item 1) to control panel (Figure 2, Item 2) and remove bridge rectifier (Figure 2, Item 1).

END OF TASK

REPLACEMENT

1. Install bridge rectifier (Figure 2, Item 1) onto control panel (Figure 2, Item 2) and secure using screw (Figure 2, Item 4) and flat washer (Figure 2, Item 3).
2. Inspect all electrical wires (Figure 2, Item 5) being connected. Ensure no physical damage is present. If necessary, repair or replace.

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

3. Connect all electrical wires (Figure 2, Item 5) to appropriate terminals on bridge rectifier (Figure 2, Item 1).

REPLACEMENT - Continued

4. Close ECU control panel door and install access cover.

5. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

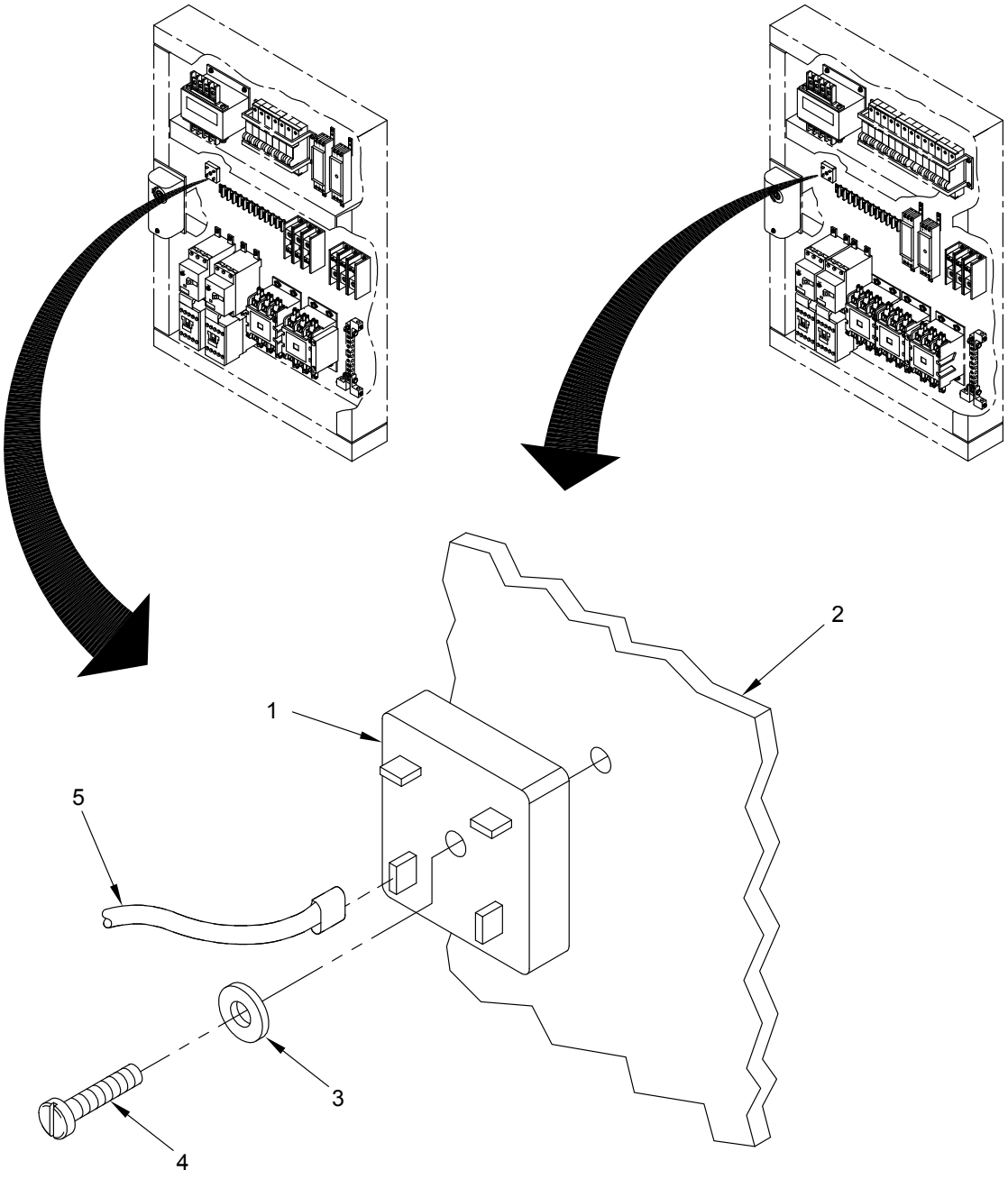


Figure 2. Bridge Rectifier Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU CONTROL PANEL – STARTER PROTECTORS

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Evaporator Motor Starter Protector (EMSP)
- Compressor Motor Starter Protector (CMSP)

WARNING

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present at the PDP. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

The following procedures apply to all relays listed in the beginning of this WP. Where applicable differences between Version 1 and Version 2 control panels will be noted.

If necessary, refer to (WP 0027) for troubleshooting and (Figures FO-1 through FO-5) for schematics/wiring diagrams.

ECU CONTROL PANEL CMSP/EMSP REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Electronic equipment tool kit (WP 0165, Item 4)
Multimeter (WP 0165, Item 2)
Safety glasses

Materials/Parts
CMSP/EMSP

Personnel Required
One

Reference
WP 0005, WP 0030,
FO-1 through FO-5

Equipment Condition
CB1 on Genset Control Panel - Off
ECU Power cable disconnected
from J1 on Genset

REMOVAL

NOTE

If necessary refer to (WP 0030) for test of the CMSP/EMSP.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down and, that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 1, Item 4) connected to the CMSP/EMSP being replaced are properly identified.
4. Loosen but do not remove terminal screws (Figure 1, Item 5) securing electrical wires (Figure 1, Item 4) to CMSP/EMSP (Figure 1, Item 1). Remove electrical wires (Figure 1, Item 4) from CMSP/EMSP (Figure 1, Item 1).
5. Remove and retain four screws (Figure 1, Item 3) that secure CMSP/EMSP (Figure 1, Item 1) to control panel (Figure 1, Item 2) remove CMSP/EMSP (Figure 1, Item 1).

END OF TASK

REPLACEMENT

1. Install CMSP/EMSP (Figure 1, Item 1) onto control panel (Figure 1, Item 2) and secure using four screws (Figure 1, Item 3).
2. Inspect all electrical wires (Figure 1, Item 4) being connected. Ensure no physical damage is present. If necessary, repair or replace.

NOTE

If necessary refer to (Figures FO-1 through FO-5) for schematic/wiring diagram of ECU.

3. Loosen but do not remove terminal screws (Figure 1, Item 5) on CMSP/EMSP (Figure 1, Item 1). Install all electrical wires (Figure 1, Item 4) and tighten terminal screws (Figure 1, Item 5).

REPLACEMENT – Continued

4. Close ECU control panel door and install access cover.

5. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

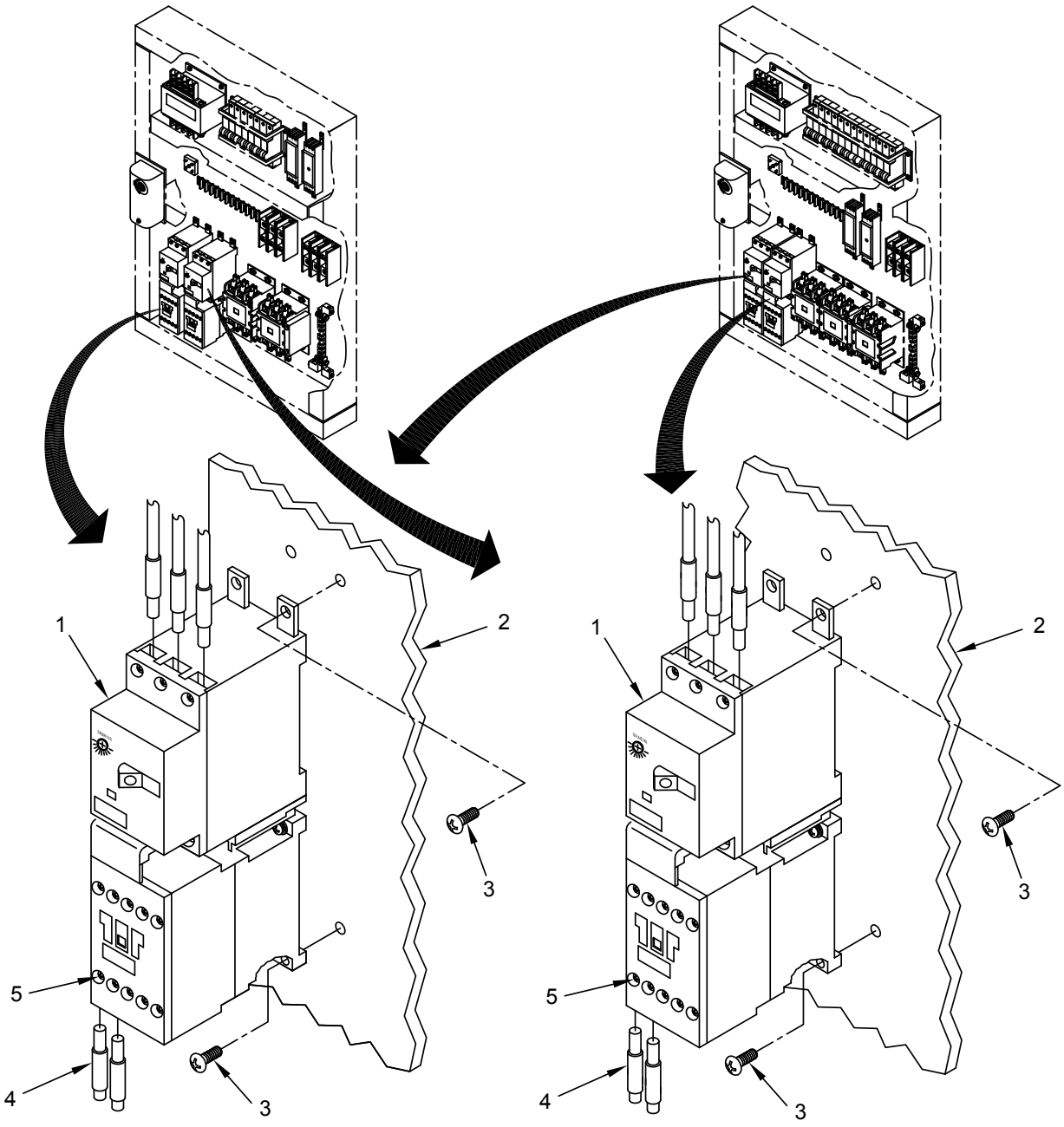


Figure 1. CMSP/EMSP Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU REMOVAL/REPLACEMENT

GENERAL

This work package provides information on the removal and replacement of the ECU used in the TMSS-MED.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the ECU.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

The ECU for the TMSS-MED weighs 520 lbs. (235.86 kg). Use only a mechanical left to move equipment. Do not attempt to lift, carry, or move the ECU without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Wear appropriate eye protection when performing maintenance. Metal pieces, fluids, dirt, grease, corrosion, and escaping vapors and gasses present. Failure to comply may result in injury to personnel.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

ECU REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)
Lifting device
Sling
Drip pan
Rubber gloves
Safety glasses

Materials/Parts
Lumber (4 in x 4 in x 4 ft.) – (4 ea)
(10.16 cm x 10.16 cm x 1.21 m)

Personnel Required
Two

References
WP 0005

Equipment Condition
ECU shut down

WARNING

HEAVY EQUIPMENT

The ECU weighs 520 lbs. Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the ECU without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Prior to removing the ECU, verify that the TMSS-MED trailer is on level ground and trailer wheels are chocked. Failure to do so can result in serious injury and equipment damage from unplanned rollout of the ECU.

Once the ECU is removed, do not allow unit to hang from lifting device. Place on level ground until ready to replace. Failure to observe this warning can result in serious injury or death to personnel or damage to ECU.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Prior to performing the following steps ensure that:
   - ECU is shut down in accordance with ECU Shut Down Procedure (WP 0005).
   - ECU is at ambient temperature.
   - Duct work is disconnected and duct covers are installed on ECU.
   - Genset is shut down in accordance with Genset Shut Down Procedure (WP 0005).
   - Trailer is level.
   - Wheels are chocked.
   - Ample room to perform the following procedure is present.
   - Area immediately around ECU is free and clear of items.
     (i.e., Storage bags, grounding, etc.).

REMOVAL – Continued

2. Disconnect the ECU power cable (Figure 1, Item 5) from the J1 connector on the Genset or from a shore power supply.

3. Unlatch and remove rear access panel and set aside.

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

4. Loosen hose clamp (Figure 1, Item 2) and disconnect fuel line (Figure 1, Item 3) from fuel filter (Figure 1, Items 1). Guide fuel line (Figure 1, Item 3) down through ECU and place in spill bucket and allow excess fuel to drain.

5. Install rear access panel.

6. Loosen two hose clamps (Figure 1, Item 9) (located on underside of ECU) and remove two drip valves (Figure 1, Item 10).

WARNING
HEAVY EQUIPMENT

The ECU weighs 520 lbs. Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the ECU without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

7. Using a suitable lifting device, attach chain/sling to the four lifting eyes (Figure 1, Item 4) on the ECU. Raise the lift only far enough to place tension (no slack) on the chain.

8. Remove and retain four bolts (Figure 1, Item 8), lock washers (Figure 1, Item 6), and flat washers (Figure 1, Item 7) from underside of ECU.

NOTE

When performing the following step, ensure that area where ECU is to be placed is dry and level. Ensure that supports allow adequate room below ECU for drainage of ECU and so that no items on bottom of ECU become damaged.

9. Place supports (i.e., 4x4 treated lumber) along ground for ECU to be placed on once removed from trailer.

CAUTION

When performing the following step, guides should be observant of ECU to ensure no pieces from ECU and/or trailer get caught while lifting is in process.

When performing the following step, guides should be observant of ECU to ensure supports are properly placed and that nothing on ECU gets damaged when placing ECU onto supports.

10. Using appropriately trained personnel, lift ECU off of trailer base and place on supports. Once ECU is safely lowered, remove chain/sling.

END OF TASK

REPLACEMENT

WARNING
HEAVY EQUIPMENT

The ECU weighs 520 lbs. Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the ECU without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

1. Using a suitable lifting device, attach chain/sling to the four lifting eyes (Figure 1, Item 4) on the ECU. Raise the lift only far enough to place tension (no slack) on the chain.

CAUTION

When performing the following step, guides should be observant of ECU to ensure safety of personnel and that no pieces from ECU and/or trailer get caught/damaged while lifting is in process.

NOTE

When performing the following step:
- Ensure that ECU is properly orientated for placement on trailer (evaporator panel should be on same side of trailer as control panel(s) of Genset).
- Lower ECU close enough to trailer to allow slight movement for alignment of hardware during installation.
- Be aware of all items on underside of ECU (i.e., drain, feed throughs, etc.).
- Inspect fuel lines for leaks or other damage.

2. Using appropriately trained personnel, lift ECU off of ground and place on trailer. Do not disconnect from chains/sling until directed to do so.

3. Install four bolts (Figure 1, Item 8), lock washers (Figure 1, Item 6), and flat washers (Figure 1, Item 7) through trailer frame and to underside of ECU. Hand tighten bolts at this time.

4. Finish lowering ECU onto trailer. Tighten all bolts previously installed. Remove chain/sling.

5. Install two drip valves (Figure 1, Item 10) (located on underside of ECU) and secure with hose clamps (Figure 1, Item 9).

6. Unlatch and remove rear access panel and set aside.

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of TMSS-MED.

7. Feed fuel line (Figure 1, Item 3) through bottom of ECU and connect to fuel filter (Figure 1, Item 1) and secure using hose clamp (Figure 1, Item 2).

REPLACEMENT – Continued

8. Install rear access panel.
9. Connect the ECU power cable (Figure 1, Item 5) to J1 on the Genset or to shore power.
10. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
11. Start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

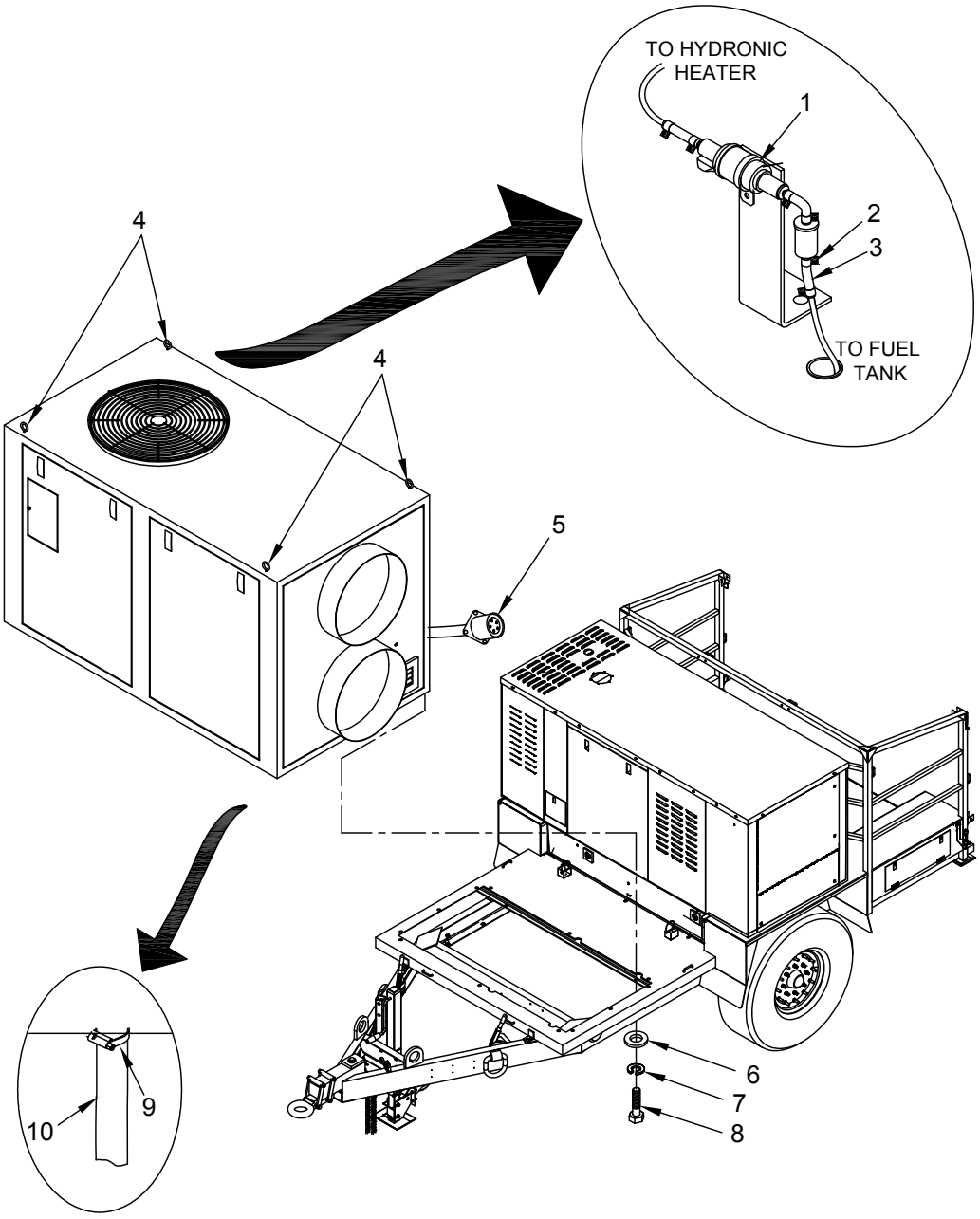


Figure 1. ECU Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU – PURGING AND BRAZING

GENERAL

This work package provides information on purging and brazing. The refrigeration system must be purged with dry nitrogen before brazing is performed on any component or tubing. A flow of dry nitrogen, at a rate less than 1-2 cfm (0.028-0.057 m3/minute), must be continued during all brazing operations to minimize internal oxidation and scaling of fluids and components or tubing. Brazing is required when removing/replacing plumbing components and associated piping inside of the ECU.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from the ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

The following procedures require the use of open flame (brazing). Be observant of all fluids and components surrounding area being brazed. Do not damage, equipment or fluids and components. Only properly trained personnel should attempt to perform brazing procedures.

Brazing alloys and flux contain materials that are hazardous to health. Avoid breathing vapors or fumes from brazing operations. Perform operations only in well ventilated areas. Wash hands with soap and water after handling brazing alloys and flux. Wear gloves and protective goggles or face shield to protect against burns.

Never use a heating torch on any part that contains refrigerant. Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. All refrigerant must be removed and recovered from the system and the entire system must be purged with dry nitrogen before beginning any brazing operation.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all fluids and components surrounding area being brazed. Do not damage, equipment or fluids and components. Only properly trained personnel should attempt to perform brazing procedures.

Cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations. Nitrogen is an inert gas. However, it also presents danger as a suffocant and, therefore, must be discharged in a ventilated location.

If heat is applied slowly, or only on one side of a connection, the entire component or length of connecting tubing will become heated and filler alloy in adjacent joints may melt.

NOTE

It may be easier to access a component by cutting or debrazing the copper lines in accessible areas and removing part of the interconnecting tubing with the component.

If necessary, refer to (WP 0027) for troubleshooting, (Figure FO-5) for refrigeration schematic and (Figure FO-1 through FO-4) for electrical schematics and wiring diagrams.

All tubing in the refrigeration system is seamless copper with a bright internal finish that permits thorough cleaning and prevents entrapment of moisture or other impurities. Rigid grade copper is used for straight sections and soft grade for sections that must be bent. All interconnecting fittings, such as elbows, tees, etc., are also copper. The bodies of valves and connections on other fluids and components are brass. Joints, except for those with flare fittings, are brazed in accordance with the American Welding Society (AWS) C3.4, Specification for Torch Brazing, except that radiographic examination is not required.

SYSTEM PURGING

INITIAL SETUP:

Tools and Special Tools
General mechanics tool kit (WP 0165, Item 1)
Refrigeration service tool kit (WP 0165, Item 3)
Nitrogen pressure regulator (WP 0165, Item 6)
Gloves, rubber (WP 0168, Item 24)
Safety glasses/face shield

Materials/Parts
Nitrogen (WP 0168, Item 40)

Personnel Required
One

Reference
WP 0005

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

NOTE

The refrigeration system must be purged with dry nitrogen before brazing is performed on any component or tubing. A flow of dry nitrogen, at a rate less than 1-2 cfm (0.028-0.057 m3/minute), must be continued during all brazing operations to minimize internal oxidation and scaling of fluids and components or tubing.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access cover(s).
3. Attach red gauge/line to LIQUID HIGH PRESSURE and blue gauge/line to SUCTION LOW PRESSURE.
4. Disconnect refrigerant hose (yellow) from gauge manifold and allow to hang open to ambient air.
5. Open valves to both gauges.
6. Observe gauges. Once both gauges read 0 psig, close valves, disconnect red gauge/line from LIQUID HIGH PRESSURE and blue gauge/line from SUCTION LOW PRESSURE.
7. Re-connect all refrigerant hoses to gauge manifold.
8. Replace covers on LIQUID HIGH PRESSURE and SUCTION LOW PRESSURE ports on ECU.
9. Proceed to brazing procedures as described in this WP.

END OF TASK

DEBRAZING

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Refrigeration service tool kit (WP 0165, Item 3)
Pressure regulator (WP 0165, Item 6)
Safety glasses /face shield
Gloves

Personnel Required
One

Reference
WP 0005

Materials/Parts
Brazing alloy, solder – QQ-S-57 (WP 0168, Item 7 or 8)
Brazing flux, soldering (WP 0168, Item 22)
Cleaning cloth (WP 0168, Item 14)
Abrasive cloth (WP 0168, Item 12)

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

DEBRAZING

1. Protect wiring harnesses and other electronic fluids and components with appropriate heat shields, heat sinks.

NOTE

It may be easier to access a component by cutting or debrazing the copper lines in accessible areas and removing part of the interconnecting tubing with the component.

2. If debrazing a joint on a valve, disassemble the valve to the fullest extent possible and wrap all but the joint with a wet rag to act as a heat sink.

WARNING

Never use a heating torch on any part that contains refrigerant. Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. All refrigerant must be removed and recovered from the system and the entire system must be purged with dry nitrogen before beginning any brazing operation.

CAUTION

If heat is applied slowly, or only on one side of a connection, the entire component or length of connecting tubing will become heated and filler alloy in adjacent joints may melt.

3. Check that the system is being purged and apply sufficient heat uniformly around the joint to quickly melt the filler alloy. Remove heat as soon as the joint is separated.

   a. All filler alloy must be cleaned from debrazed joints before reassembly.

   b. Heat each piece of the joint until the filler alloy is melted and then wipe it away with a damp cloth. Be sure no filler alloy or other debris is left inside any tubing, fitting or component. Use abrasive cloth as necessary to clean joints.

END OF TASK

BRAZING

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Refrigeration service tool kit (WP 0165, Item 3)
Pressure regulator (WP 0165, Item 6)
Safety glasses/face shield
Gloves

Personnel Required
One

Reference
WP 0005

Materials/Parts
Brazing alloy, solder – QQ-S-57 (WP 0168, Item 7 or 8)
Brazing flux, soldering (WP 0168, Item 22)
Cleaning cloth (WP 0168, Item 14)
Abrasive cloth (WP 0168, Item 12)

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

BRAZING

1. Protect wiring harnesses and other fluids and components with appropriate heat shields and heat sinks.

NOTE

Joints, except for those with flare fittings, are brazed using Grade IV or VI brazing alloy (15% silver) and Type-B flux must be used for all copper to brass joints. Grade III (45% silver) brazing alloy may be substituted for Grade IV or VI for copper-to-copper joints; flux is not required for copper-to-copper joints.

2. If brazing a joint on a valve, disassemble the valve to the fullest extent possible and wrap all but the joint with a wet rag to act as a heat sink.

NOTE

If interconnecting tubing was removed with a component, braze tubing to the new fluids and components before installation.

3. Clean all internal and external areas to be brazed with abrasive cloth.

4. Apply flux to all internal and external areas to be brazed.

5. Position component(s) or assembly into place.

BRAZING – Continued

WARNING

Never use a heating torch on any part that contains refrigerant. Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. All refrigerant must be removed and recovered from the system and the entire system must be purged with dry nitrogen before beginning brazing operations.

CAUTION

If heat is applied slowly, or to one side of a connection, the entire component or length of tubing will become heated and filler alloy in adjacent joints may melt. Brazing a joint without nitrogen flow through the tubing will cause deposits to form on the inside of the tube and may cause obstructions in the refrigeration system or equipment damage.

4. Check that the system is being purged (see procedure in this WP) and apply sufficient heat uniformly around the joint to quickly melt the filler alloy. Remove heat as soon as brazing is completed. Continue purging for at least five (5) minutes or until the connection has cooled.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU – LEAK TESTING

GENERAL

This work package provides information on leak testing (using nitrogen). The ECU must be a closed, sealed, system any leakage will inhibit the system and the ECU will not operate properly.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from the ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Sudden and irreversible tissue damage can result from freezing. Wear gloves and a face protector or safety glasses in any situation where skin or eye contact with refrigerant is possible.

Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. Prevent contact of refrigerant with flame or hot surfaces.

Never introduce high discharge pressure into a refrigerant cylinder. This can cause the cylinder to rupture and injure personnel.

CAUTION

Cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations. Nitrogen is an inert gas. However, it also presents danger as a suffocant and, therefore, must be discharged in a ventilated location.

NOTE

The electronic refrigerant gas leak detector is highly sensitive to the presence of minute quantities of gas in the air, due to this fact it is quite effective in the detection of small leaks. However, because of the rapid dispersion of refrigerant gas into the surrounding air, difficulty may be encountered in pinpointing large leaks. The detector must be used in a well ventilated but draft-free area.

LEAK TESTING

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Refrigeration service tool kit (WP 0165, Item 3)
Nitrogen pressure regulator (WP 0165, Item 6)
Refrigerant recovery/recycling unit (WP 0165, Item 7)
Safety glasses/face shield
Gloves, rubber (WP 0168, Item 24)

Materials/Parts
Nitrogen (WP 0168, Item 40)
Refrigerant (R407c) (WP 0168, Item 47)

Personnel Required
One

Reference
WP 0110

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

ADDING NITROGEN HOLDING CHARGE

NOTE

Prior to beginning the following procedure, make sure all valves are closed.

1. Attach red gauge/line to LIQUID HIGH PRESSURE and blue gauge/line to SUCTION LOW PRESSURE.
2. Attach refrigerant hose (yellow) to refrigerant bottle.
3. With refrigerant recovery/recycling unit inverted (valve at the bottom) open the valve on the unit.
4. Open the high side valve (red) on the gauge manifold and add 15 psig of refrigerant to the system.
5. Once 15 psig of refrigerant has been added, close the valves on the refrigerant recovery/recycling unit and the high side valve (red) on the gauge manifold.
6. Disconnect the refrigerant hose (yellow).
7. Set the nitrogen regulator to 400 psgi.
8. Connect the refrigerant hose (yellow) to the pressure regulator on the nitrogen tank.
9. Slowly open valves on nitrogen tank and high side valve (red) on the gauge manifold and slowly add nitrogen.
10. When gauge manifold reads 350 psig close high side valve (red) on gauge manifold then close valve on the nitrogen regulator and check for leaks as described in this WP.

END OF TASK

LEAK TESTING

Using Electronic Refrigerant Leak Detector

1. Allow system to "stand idle" for 30 minutes.
2. Check pressure gauges for excessive drops in pressure.

NOTE

The electronic refrigerant gas leak detector is highly sensitive to the presence of minute quantities of gas in the air, due to this fact it is quite effective in the detection of small leaks. However, because of the rapid dispersion of refrigerant gas into the surrounding air, difficulty may be encountered in pinpointing large leaks. The detector must be used in a well ventilated but draft-free area.

3. If no excessive leaks are observed, check ECU components and joints with electronic refrigerant leak detector.
4. If no excessive leaks are found with electronic refrigerant leak detector, purge system as described in (WP 0110) of this TM.
5. If leaks are found, continue purging system and repair leaks and or replace parts as required. Once repairs are completed, re-test for leaks.

END OF TASK

Using Soap Solution

1. Allow system to "stand idle" for 30 minutes.
2. Check pressure gauges for excessive drops in pressure.

If no excessive leaks are observed:

3. Mix a solution of liquid detergent and water.
4. Brush solution onto all possible leakage points
5. Observe for the formation of bubbles.
6. If no excessive leaks are found, purge system as described in (WP 0110) of this TM.
7. If leaks are found, repair leaks and or replace parts as required. Once repairs are completed, re-test for leaks.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU – SYSTEM EVACUATION

GENERAL

This work package provides information on system evacuation (vacuuming). The ECU must be evacuated to remove all moisture and air before it is charged. These procedures describe how to accomplish such tasks.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from the ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Sudden and irreversible tissue damage can result from freezing. Wear gloves and a face protector or safety glasses in any situation where skin or eye contact with refrigerant is possible.

Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. Prevent contact of refrigerant with flame or hot surfaces.

Never introduce high discharge pressure into a refrigerant cylinder. This can cause the cylinder to rupture and injure personnel.

CAUTION

Cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations. Nitrogen is an inert gas. However, it also presents danger as a suffocant and, therefore, must be discharged in a ventilated location.

NOTE

The electronic refrigerant gas leak detector is highly sensitive to the presence of minute quantities of gas in the air, due to this fact it is quite effective in the detection of small leaks. However, because of the rapid dispersion of refrigerant gas into the surrounding air, difficulty may be encountered in pinpointing large leaks. The detector must be used in a well ventilated but draft-free area.

SYSTEM EVACUATION

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Refrigeration service tool kit (WP 0165, Item 3)
Pump, vacuum (WP 0165, Item 8)

Materials/Parts
Hoses 1/2" ID

Personnel Required
One

Reference
WP 0005, WP 0102, WP 0111, WP 0113

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
ECU Power cable disconnected from J1 on Genset

PREPERATION

NOTE

The following procedure may be accomplished from the LIQUID HIGH PRESSURE and SUCTION LOW PRESSURE connections located on the outside of the ECU. However, manufacturer recommends that this process be accomplished from the internal ports.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB1 on Genset is shut down, and that power cable has been disconnected from J1 of power distribution panel on Genset.
2. Remove access cover(s).
3. Ensure that system refrigerant has been removed and recovered as described in (WP 0113).
4. Ensure that system has been leak tested as described in (WP 0111).
5. Ensure that new filter/dryer has been properly installed as described in (WP 0102).

SHOP METHOD

1. Connect valve core removal isolation valves to the high pressure port (located next to the evaporator/dryer) inside the ECU (see Figure 1).
2. Connect valve core removal isolation valves to the low pressure port (located behind the evaporator/dryer) inside the ECU (see Figure 1).
3. Connect vacuum hoses to the pump inlet (see Figure 1).
4. Connect micron gauge to vacuum pump.
5. Remove valve cores and close isolation valve.

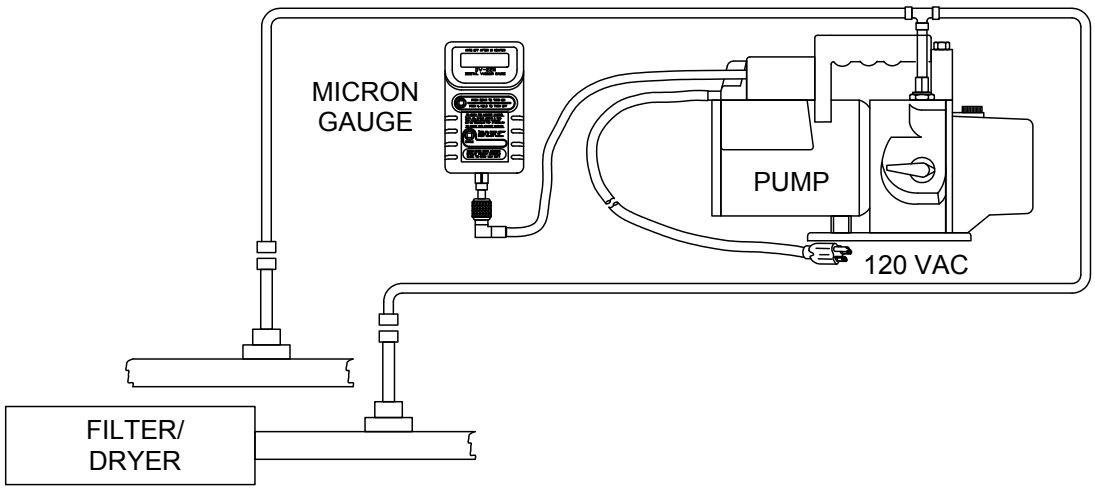


Figure 1. Evacuation Set-up (Shop Method).

FIELD METHOD

1. Connect high pressure hose (red) from gauges to high pressure port (located next to the evaporator/dryer) inside the ECU (see Figure 2).

2. Connect low pressure hose (blue) from gauges to low pressure port (located behind to the evaporator/dryer) inside the ECU (see Figure 2).

3. Connect micron gauge to vacuum pump.

4. Connect vacuum line (yellow) from gauges to micron gauge.

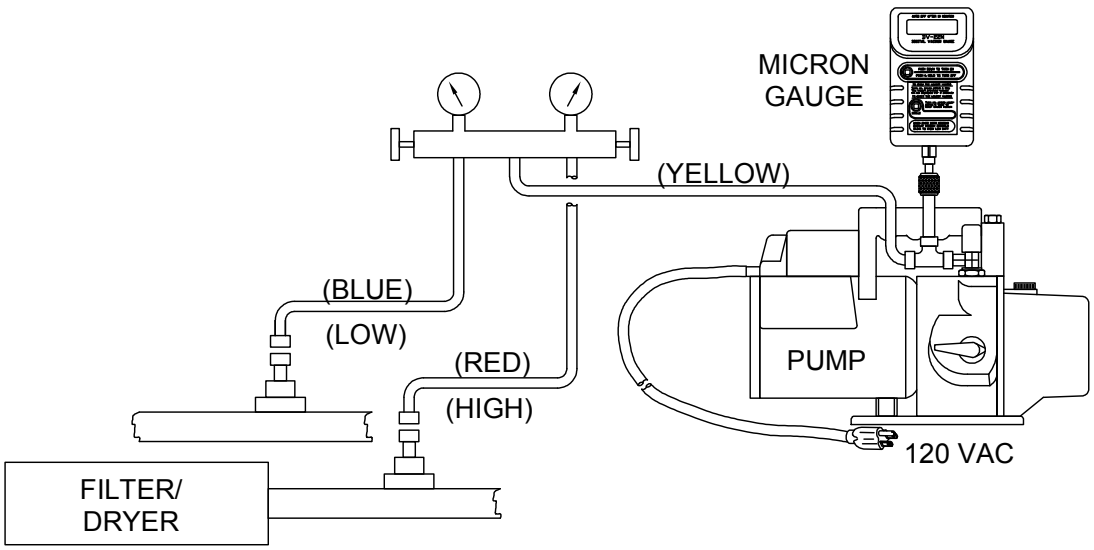


Figure 2. Evacuation Set-up (Field Method).

PROCEDURE

1. Check level and quality of oil in the vacuum pump.

2. Start pump and open valve on the pump inlet.

3. Set micron gauge to ON. After micron gauge reads 500 or less for several minutes, open isolation valves and reinstall service valve cores.

NOTE

While waiting for vacuum to complete, set up equipment for charging of system with R-407c (see WP 0113).

4. Once vacuum process is complete, de-energize pump and micron gauge.

5. Remove low pressure hose (blue), high pressure hose (red) and vacuum line (yellow) and replace service caps on the high pressure port (located next to the evaporator/dryer) and low pressure port (located behind the evaporator/dryer) inside the ECU.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU – SYSTEM CHARGING AND RECOVERY

GENERAL

This work package provides information on system evacuation (vacuuming). The ECU must be evacuated to remove all moisture and air before it is charged. These procedures describe how to accomplish such tasks.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from the ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Sudden and irreversible tissue damage can result from freezing. Wear gloves and a face protector or safety glasses in any situation where skin or eye contact with refrigerant is possible.

Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. Prevent contact of refrigerant with flame or hot surfaces.

Never introduce high discharge pressure into a refrigerant cylinder. This can cause the cylinder to rupture and injure personnel.

Never introduce liquid refrigerant into the suction shut off valve. This can cause damage to the compressor.

CAUTION

Cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations. Nitrogen is an inert gas. However, it also presents danger as a suffocant and, therefore, must be discharged in a ventilated location.

NOTE

The electronic refrigerant gas leak detector is highly sensitive to the presence of minute quantities of gas in the air, due to this fact it is quite effective in the detection of small leaks. However, because of the rapid dispersion of refrigerant gas into the surrounding air, difficulty may be encountered in pinpointing large leaks. The detector must be used in a well ventilated but draft-free area.

REFIGERANT SYSTEM RECOVERY

INITIAL SETUP:

Tools and Special Tools
General mechanics tool kit (WP 0165, Item 1)
Refrigeration service tool kit (WP 0165, Item 3)
Refrigerant recovery/recycling unit (WP 0165, Item 7)
Charging manifold (WP 0165, Item 9)
Charging cylinder (WP 0165, Item 10)
Rubber gloves (WP 0168, Item 24)
Safety glasses/face shield

Materials/Parts
Refrigerant (WP 0168, Item 47)

Personnel Required
One

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
Power cable disconnected
from J1 on Genset

PROCEDURE

NOTE

Prior to beginning the following procedure, make sure all valves are closed. After completing the procedure, perform a Confidence Check.

The refrigerant recovery/recycling unit should be fitted with a filter/dryer for improved performance and preservation of the refrigerant.

When recovering refrigerant, never exceed 80% capacity of the recovery cylinder. This will allow for expansion of refrigerant due to heat during storage and/or transportation.

1. Connect red gauge/line to LIQUID HIGH PRESSURE and blue gauge/line to SUCTION LOW PRESSURE.
2. Connect refrigerant hose (yellow) to refrigerant recovery unit inlet (see Figure 1).
3. Connect refrigerant recovery unit to vapor valve (blue) on recovery cylinder (see Figure 1).
4. Open vapor valve (blue) on recovery cylinder.
5. Power on recovery unit.
6. Open outlet ball valve on the refrigerant recovery unit.
7. Open liquid valve (red) on service gauge.
8. On recovery unit, press compressor start switch.
9. Open inlet ball valve on recovery unit until gauges show 0 psig.
10. Once gauges read 0 psig, close all valves on recovery cylinder, service gauge, recovery unit.
11. Remove all hoses and return all equipment to its appropriate storage.

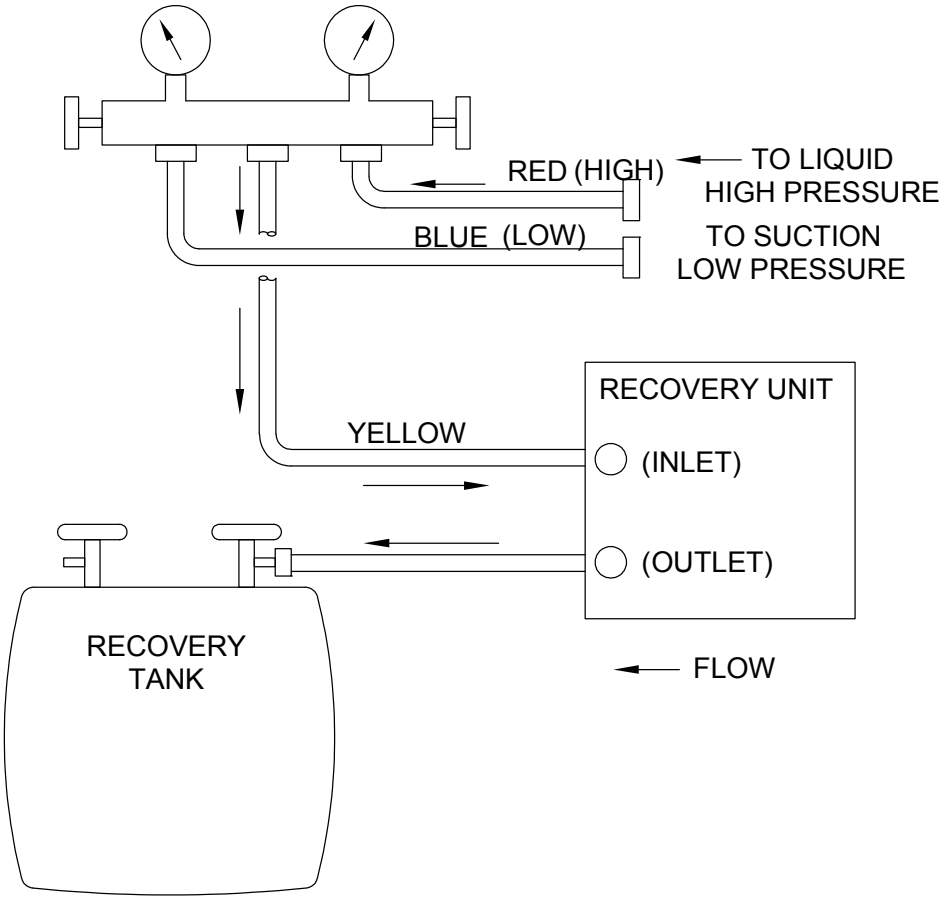


Figure 1. Refrigerant Recovery Layout.

END OF TASK

REFIGERANT SYSTEM CHARGING

INITIAL SETUP:

Tools and Special Tools
General mechanics tool kit (WP 0165, Item 1)
Refrigeration service tool kit (WP 0165, Item 3)
Refrigerant recovery/recycling unit (WP 0165, Item 7)
Charging manifold (WP 0165, Item 9)
Charging cylinder (WP 0165, Item 10)
Rubber gloves (WP 0168, Item 24)
Safety glasses/face shield

Materials/Parts
Refrigerant (WP 0168, Item 47)

Personnel Required
One

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
Power cable disconnected
from J1 on Genset

PROCEDURE

WARNING

Never introduce liquid refrigerant into the suction shut off valve. This can cause damage to the compressor.

Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. Prevent contact of refrigerant with flame or hot surfaces.

The system must be evacuated before charging. Moisture and air in the system will prevent the refrigeration unit from operating properly.

NOTE

The refrigerant should be fitted with a filter/dryer for improved performance and preservation of the refrigerant.

Prior to beginning the following procedure, make sure all valves are closed. After completing the procedure, perform a Confidence Check.

Using Electronic Refrigerant Scale.

1. Connect refrigerant hose (red) from service gauges to input high pressure line (inside ECU, near filter/Dryer).
2. Connect refrigerant hose (blue) from service gauges to low pressure line (inside ECU, behind filter/Dryer).
3. Connect refrigerant hose (yellow) from service gauges to output on electronic refrigerant scale (see Figure 2).
4. Connect refrigerant hose from bottle of R-407c to input side of electronic refrigerant scale (see Figure 2).
5. Open valve on bottle of R-407c (valve at top).
6. Place electronic refrigerant scale on flat level surface and prepare scale for use.
7. Invert bottle of R-407c (valve at bottom) and place on electronic refrigerant scale.
8. Set electronic refrigerant scale for 8.4 pounds of refrigerant and start electronic refrigerant scale.
9. SLOWLY open hi pressure valve (red) on service gauges.

Using Electronic Refrigerant Scale – Continued

10. When electronic refrigerant scale closes and alarm sounds, close hi pressure valve (red) on service gauges.
11. Close valve on bottle of R-407c and remove bottle of R-407c from electronic refrigerant scale.
12. Disconnect refrigerant hose (yellow) from electronic refrigerant scale.
13. Disconnect refrigerant hose (red) from input high pressure line (inside ECU, near filter/Dryer) and replace cap.
14. Disconnect refrigerant hose (blue) from low pressure line (inside ECU, behind filter/Dryer) and replace cap.

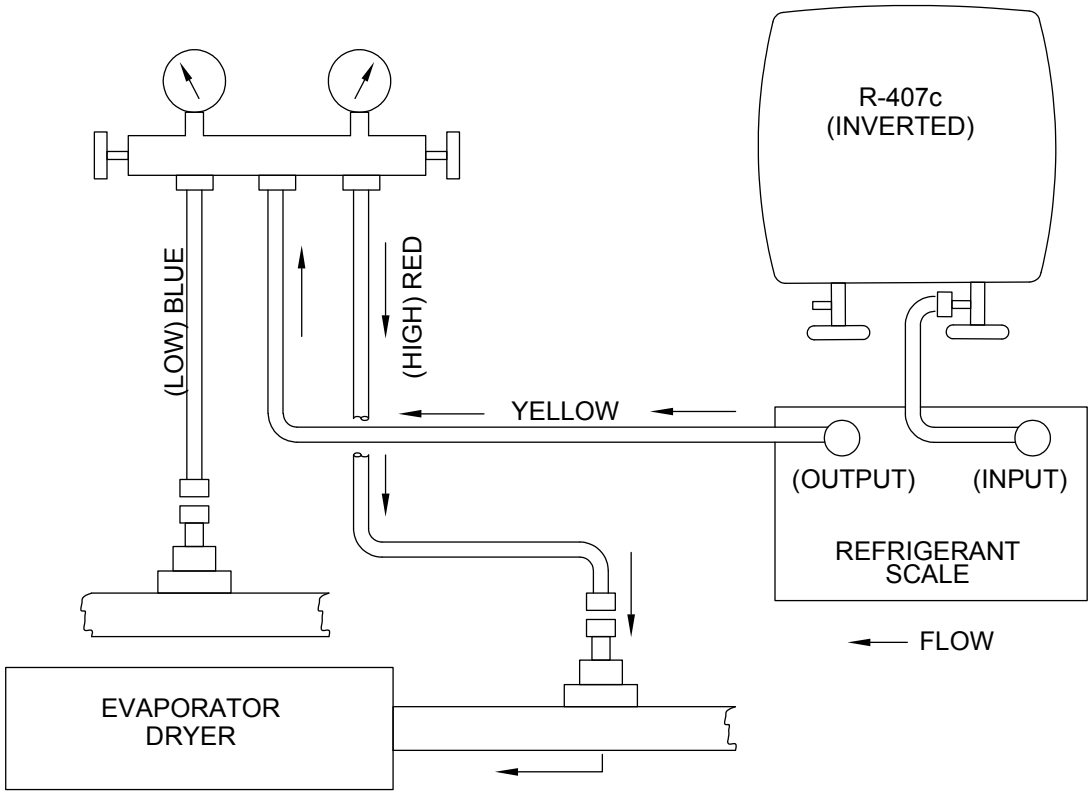


Figure 2. System Charging (Using Electronic Refrigerant Scale).

END OF TASK

Using Standard Scale

1. Connect refrigerant hose (red) from service gauges to input high pressure line (inside ECU, near filter/Dryer) (see Figure 3).
2. Connect refrigerant hose (blue) from service gauges to low pressure line (inside ECU, behind filter/Dryer).
3. Place bottle of R-407c on scale noting starting weight of bottle of R-407c and calculate desired end weight for desired charge.
4. Connect refrigerant hose (yellow) from service gauges to output bottle of R-407c (see Figure 3).

Using Standard Scale - Continued

5. Open valve on bottle of R-407c (valve at top).
6. Place scale on flat level surface.
7. Invert bottle of R-407c (valve at bottom) and place on scale.
8. SLOWLY open hi pressure valve (red) on service gauges and monitor weight of bottle on scale.
9. When scale reads desired calculated weight, close hi pressure valve (red) on service gauges.
10. Close valve on bottle of R-407c and remove bottle from scale.
11. Disconnect refrigerant hose (yellow) from bottle of R-407c.
12. Disconnect refrigerant hose (red) from input high pressure line (inside ECU, near filter/Dryer) and replace cap.
13. Disconnect refrigerant hose (blue) from low pressure line (inside ECU, behind filter/Dryer) and replace cap.

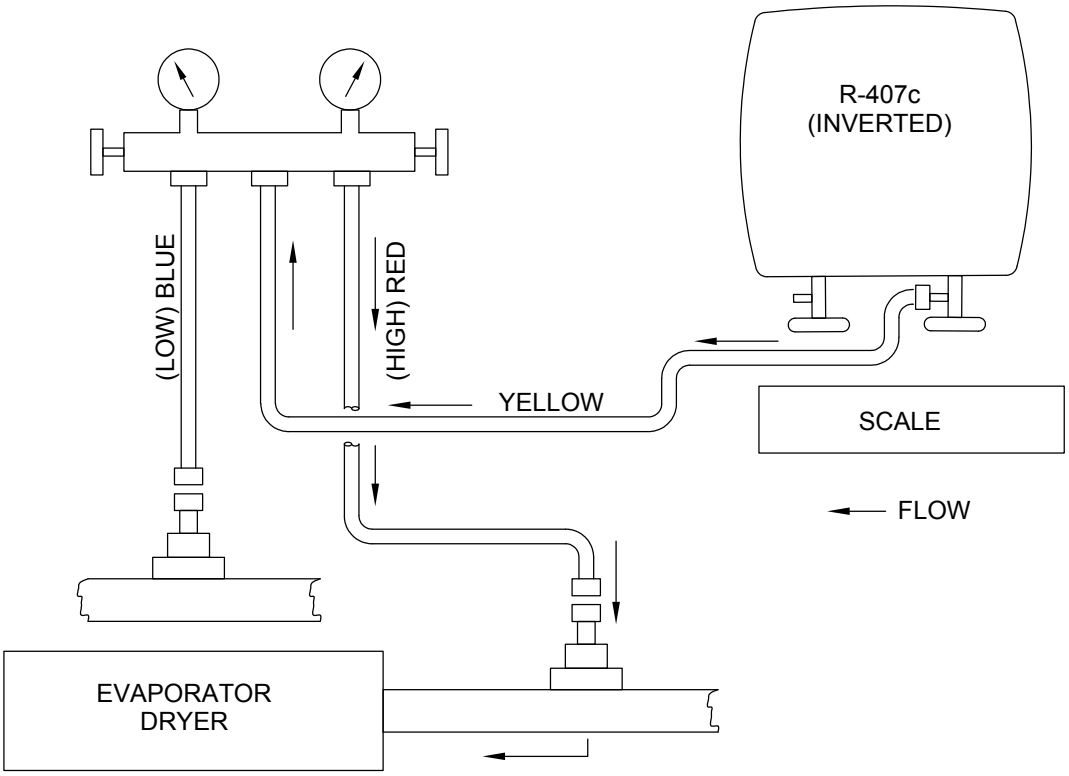


Figure 3. System Charging (Using Standard Scale).

END OF TASK

Confidence Check

1. Connect refrigerant hose (red) from service gauges to input high pressure line (inside ECU, near filter/Dryer).
2. Connect refrigerant hose (blue) from service gauges to low pressure line (inside ECU, behind filter/Dryer).
3. Turn on ECU (WP 0005) and allow system to stabilize for half an hour.
4. Verify that the HPC or LPC switch does not shut down the compressor.

NOTE

The HPC switch cutout is 500 PSIG +/- 3% and cutin (with manual reset button) is 375 PSIG +/- 8%.

The LPC switch cutout is 25 PSIG +/- 3 % and cutin is 50 PSIG +/- 3%.

5. Verify that the ECU provides conditioned air.
6. Turn off ECU (WP 0005) and allow system components to cool before completing step 7.
7. Disconnect refrigerant hose (red) from input high pressure line (inside ECU, near filter/Dryer) and replace cap.
8. Disconnect refrigerant hose (blue) from low pressure line (inside ECU, behind filter/Dryer) and replace cap.
9. Return ECU to service.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
ECU – SUBCOOL SETTING

GENERAL

This work package provides information on checking, setting and adjusting subcool. Subcool is the difference in degrees between the saturation temperature of the refrigerant at its current pressure and the actual temperature of the liquid. In other words, the refrigerant pressure remains constant while the temperature is lowered. The number of degrees F below the condensation point is the amount of subcool.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from the ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Sudden and irreversible tissue damage can result from freezing. Wear gloves and a face protector or safety glasses in any situation where skin or eye contact with refrigerant is possible.

Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. Prevent contact of refrigerant with flame or hot surfaces.

Never introduce high discharge pressure into a refrigerant cylinder. This can cause the cylinder to rupture and injure personnel.

Never introduce liquid refrigerant into the suction shut off valve. This can cause damage to the compressor.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around TMSS-MED. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations. Nitrogen is an inert gas. However, it also presents danger as a suffocant and, therefore, must be discharged in a ventilated location.

SUBCOOL CHECKING/ADJUSTING

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Refrigeration service tool kit (WP 0165, Item 3)
Refrigerant recovery/recycling unit (WP 0165, Item 7)
Charging cylinder (WP 0165, Item 10)
Gloves, rubber (WP 0168, Item 24)
Safety glasses/face shield

Materials/Parts
Refrigerant (WP 0168, Item 47)

Personnel Required
One

Reference
WP 0005, WP 0113

Equipment Condition
ECU Shut Down
CB1 on Genset Control Panel - Off
Power cable disconnected from J1 on Genset

SET-UP

NOTE

Prior to beginning the following procedure, make sure ALL valves are closed.

The refrigerant recovery/recycling unit should be fitted with a filter/dryer for improved performance and preservation of the refrigerant.

When recovering refrigerant, never exceed 80% capacity of the recovery cylinder. This will allow for expansion of refrigerant due to heat during storage and/or transportation.

Return air ambient temperature must be above 70°F to perform the following procedure.

1. Place thermocouple wire near discharge side of condenser and tape as close to inlet side of filter/dryer as possible.
2. Install all access panels to ensure no ambient temperatures may be introduced.
3. Verify that ductwork is connected. If ductwork is not available, cover ends to restrict return air flow.
4. Connect red line to LIQUID HIGH PRESSURE.
5. Connect blue line to SUCTION LOW PRESSURE.
6. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.
7. Set MODE SELECT switch to COOL and adjust TEMPERATURE to 70°F.

END OF TASK

CHECKING

NOTE

R-407c has a glide, pressure on gauge will modulate, use mean pressure for determining reading.

1. After allowing ECU to stabilize (approx. 30 minutes), read temperature on thermocouple and pressure on high pressure gauge and record.

2. Using refrigerant chart for R-407c, convert reading from high pressure gauge to temperature.

3. Subtract thermocouple temperature from refrigerant chart for R-407c temperature (bubble point). The result is the subcool value. (i.e., using R-407C. The liquid refrigerant temperature is 110°F. The refrigerant pressure gauge reads 298 psig. From the Bubble Pressure in (Table 1), 298 psig converts to 120°F. Therefore, the subcooling is: 120°F minus 110°F equals 10°F).

END OF TASK

ADJUSTING

NOTE

If subcool is not between 14 and 19 perform the following.

Refer to (WP 0113) for charging and recovery procedures.

1. If subcool is below 14:

   a. Add four ounces of refrigerant to the low pressure service port.

   b. After allowing ECU to stabilize (approx. 10 minutes), read temperature on thermocouple and pressure on high pressure gauge and record.

   c. Subtract thermocouple temperature from refrigerant chart for R-407c temperature (bubble point). The result is the subcool value. (i.e., using R-407C. The liquid refrigerant temperature is 110°F. The refrigerant pressure gauge reads 298 psig. From the Bubble Pressure in (Table 1), 298 psig converts to 120°F. Therefore, the subcooling is: 120°F minus 110°F equals 10°F).

   d. If necessary repeat procedure until subcool is met.

2. If subcool is above 19:

   a. Remove four ounces of refrigerant to the low pressure service port.

   b. After allowing ECU to stabilize (approx. 10 minutes), read temperature on thermocouple and pressure on high pressure gauge and record.

   c. Subtract thermocouple temperature from refrigerant chart for R-407c temperature (bubble point). The result is the subcool value. (i.e., using R-407C. The liquid refrigerant temperature is 110°F. The refrigerant pressure gauge reads 298 psig. From the Bubble Pressure in (Table 1), 298 psig converts to 120°F. Therefore, the subcooling is: 120°F minus 110°F equals 10°F).

   d. If necessary repeat procedure until subcool is met.

END OF TASK

Table 1. R407c Conversion Table.

R-407c			
TEMPERATURE		BUBBLE PRESSURE (psig)	DEW PRERSSURE (psig)
°F	°C		
-60	-51.1	9.1 ("Hg Vac)	15.9 ("Hg Vac)
-55	-48.3	5.9 ("Hg Vac)	13.5 ("Hg Vac)
-50	-45.5	2.4 ("Hg Vac)	10.9 ("Hg Vac)
-45	-42.7	0.7	7.9 ("Hg Vac)
-40	-40	2.9	4.5 ("Hg Vac)
-35	-37.2	5.2	0.7 ("Hg Vac)
-30	-34.4	7.9	1.7
-25	-31.6	10.7	4.0
-20	-28.8	13.9	6.5
-15	-26.1	17.3	9.3
-10	-23.3	21.1	12.4
-5	-20.5	25.2	15.8
0	-17.7	29.6	19.5
5	-15	34.4	23.6
10	-12.2	39.6	28.0
15	-9.4	45.2	32.7
20	-6.6	51.3	37.9
25	-3.8	57.8	43.6
30	-1.1	64.7	49.6
35	1.6	72.2	55.2
40	4.4	80.2	63.2
45	7.2	88.7	70.7
50	10	97.6	78.8
55	12.7	107.5	87.5
60	15.5	117.7	96.8
65	18.3	128.7	105.7
70	21.1	140.2	117.2
75	23.8	152.5	128.4
80	26.6	165.5	140.4
85	29.4	179.2	153.1
90	32.2	193.6	166.5
95	35	208.8	180.8
100	37.7	224.9	195.8
105	40.5	241.8	211.8
110	43.3	259.6	228.7
115	46.1	278.2	246.5
120	48.8	297.8	265.3
125	51.6	318.3	285.2
130	54.4	339.9	306.1
135	57.2	362.4	328.2
140	60	386.0	351.4
145	62.7	410.7	375.9
150	65.5	436.5	401.7

END OF WORK PACKAGE

CHAPTER 8

MAINTAINER MAINTENANCE INSTRUCTIONS FOR TMSS-MED TRAILER & SHELTER

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
SERVICE UPON RECEIPT – TRAILER & SHELTER

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

References
WP 0005, WP 0019, WP 0037, WP 0039 – WP 0081

Personnel Required
Two to four

GENERAL

The following procedures are required to be performed by Maintainer level maintenance in order to prepare the TMSS-MED trailer for use.

SITING

For minimal problems with set-up and operation of TMSS-MED and equipment being used insure area is:

- Dry.
- Level with adequate room for trailer, shelter, system grounding, and all other associated equipment.
- Free of items (trees, buildings, or other structures) that would impede set-up of TMSS-MED or cause physical interference for trailer, shelter, system grounding, and all other associated equipment.
- Free of items (e.g., towers, power lines, radar, trees, buildings) that would cause interference with electronic equipment being used inside of shelter.

SHELTER/TRAILER REQUIREMENTS

The TMSS-MED trailer requires dry, level, obstruction free area for operation. The trailer is designed to be towed by a vehicle capable of pulling 4,200 lbs. It is capable of being connected to the towing vehicle's electronics via a standard MIL-type connector or a commercial vehicle connector. It also requires the towing vehicle to have pneumatic brakes. The trailer requires an area of 15 ft 11 in L x 7 feet 1 inch W x 6 feet 6 in H (4.85 m L x 2.16 m W x 1.97 m H). See (WP 0002) for full technical specifications.

The TMSS-MED shelter requires a footprint of 23 feet (7.01 meters) by 32 feet (9.75 meters). In addition, the TMSS-MED trailer requires a foot print of 16 feet (4.85 meters) by 7 feet (2.16 meters) for set-up and installation.

SERVICE UPON RECEIPT

Once all covers are removed, inspect the trailer, shelter, and each piece of equipment for damage incurred during shipment. Inspect all loose pieces of equipment located in the trailer cargo box. Inspect the trailer (including under carriage) and its components (i.e. frame, electrical, brakes and associated lines and components) for damage incurred during shipment. If any damage is visible, notify supervisor. Report the damage on DD Form 361, Transportation Discrepancy Report. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with applicable service instructions.

INSTALLATION INSTRUCTIONS

The TMSS-MED trailer requires some assembly depending on the mode of operation. To setup the TMSS-MED trailer in a fixed mode of operation, refer to Operation Under Usual Conditions (WP 0005) for setup and power-up procedures.

PRELIMINARY SERVICING OF EQUIPMENT

WARNING

If trailer has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from the trailer. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death. When working on the TMSS-MED, do not operate electric equipment if floors, ceiling or walls of the individual enclosure show evidence of water intrusion. Electrical shock can cause personnel injury or death.

Do not apply power if grounding is not connected. Electrical shock can cause personnel injury or death.

The TMSS-MED trailer carries an expandable shelter. Care must be taken in the removal and replacement of this equipment from the trailer to avoid damage. Maintainer PMCS for the TMSS-MED trailer is in (WP 0037). For Maintainer level removal and replacement procedures of components and assemblies refer to (WP 0039 through WP 0081).

Once the TMSS-MED has been placed into service, the following maintenance should be performed after the first 50 hours of operation.

- Change oil & filter
- Check tension on all belts
- Check coolant level

PRELIMINARY CHECK AND ADJUSTMENTS OF EQUIPMENT

Before placing the TMSS-MED trailer into service, ensure that all Crew PMCS (WP 0019) and Maintainer PMCS (WP 0032 and WP0033) have been performed.

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
PMCS INTRODUCTION – TRAILER & SHELTER

GENERAL

This work package provides data necessary to keep the TMSS-MED trailer operational ready. PMCS are performed to keep the TMSS-MED trailer and shelter in operational condition. The checks are used to find, correct, and report problems. Maintenance personnel are required to perform the tasks as indicated in Maintainer PMCS (WP 0117, Table 1). PMCS are performed the Maintainer each time the equipment is operated. Prior to performing maintenance that requires climbing on or under TMSS-MED trailer, ensure cage bolts are not inserted and wheels are chocked. Injury to personnel could result from TMSS-MED trailer suddenly rolling or tipping.

Before you begin operating the TMSS-MED trailer and/or its equipment, do Before PMCS.

Once a week do Weekly PMCS. If TMSS-MED trailer has not been operated in a week, perform Before PMCS.

Do Monthly PMCS once a month. If TMSS-MED trailer has not been operated in a month, perform PMCS as outlined in (WP 0117).

If you are operating the TMSS-MED trailer for the first time, perform Weekly and Monthly PMCS the first time you do your Before PMCS.

If you find something wrong when performing PMCS, fix it if you can. Otherwise, notify your supervisor.

WARNINGS AND CAUTIONS

Special attention should be paid to the WARNINGS and CAUTIONS appearing in the Maintainer PMCS table. A WARNING means someone could be injured. A CAUTION means equipment could be damaged.

LEAKAGE DEFINITION

It is necessary for you to know how fluid leakage affects the status of the trailer. The following are definitions of the classes of leakage you need to know to be able to determine the status of the trailer. Learn these leakage definitions when in doubt contact your supervisor.

CAUTION

Maintainers must perform appropriate maintenance when Operators report Class III leaks. Failure to comply may result in damage to equipment.

NOTE

The following note applies to non-flammable liquids only. Any leakage of flammable liquid is unacceptable.

Equipment operation is allowable with minor leakages (Class I or II). Consideration must be given to fluid capacity of the item or system being checked. When Maintainer is in doubt, notify your supervisor.

When operating with Class I or II leaks, continue to check fluid levels as required in your PMCS.

LEAKAGE DEFINITION – Continued

CLASS I - Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

CLASS II - Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked.

CLASS III - Leakage of fluid great enough to form drops that fall from the item being checked.

INSPECTION

Look for signs of a problem or trouble. Senses help here. You can feel, smell, hear, or see many problems. Be alert when on the TMSS-MED trailer.

Inspect to see if components are in good condition. Are they correctly assembled, stowed, and secured, or excessively worn, leaking, corroded, or damaged? Correct any problems found or notify your supervisor.

There are some common items to check all over the TMSS-MED trailer. These include the following:

1. Bolts, clamps, nuts, and screws: Continuously check for looseness. Look for chipped paint, rust, or corrosion around bolt and screw heads and nuts. Tighten them when you find them loose. If tools are not available, notify your supervisor.

2. Welds: Many items on the TMSS-MED trailer are welded. To check these welds, look for chipped paint, rust corrosion, or gaps. When these conditions exist, Maintainer must notify their supervisor.

3. Electrical wires, connectors, and harnesses: Tighten loose connectors. Look for cracked or broken insulation, bare wires, and broken connectors. If any damage is found, Maintainer must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify their supervisor.

4. Hoses and fluid lines: Look for wear, damage and leaks, and make sure clamps and fittings are tight. Wet spots mean a leak. A stain by a fitting or connector can also mean a leak. If any leaks or damage is found, Maintainer must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify their supervisor.

5. Tires, and associated brake components. Look for excessive wear and damage. Check tires for excessive or un-even wear. Check brake shoes and all associated components for leaks, excessive wear or damage. If excessive/ un-even wear or damage is found, Maintainer must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify their supervisor.

LUBRICATION MAINTAINER INTERVALS - NORMAL CONDITIONS

General

For safer, more trouble-free operations, make sure that your TMSS-MED trailer is serviced when it needs it. Proper maintenance intervals which are the responsibility of the Maintainer level maintenance are found in this chapter.

Adherence

Intervals (on-condition or hard time) and the related man-hour times are based on normal operation. The man-hour time specified is the time needed to do all the maintenance prescribed for a particular interval. On-condition (OC) oil sample intervals shall be applied. Change the hard time interval if lubricants are contaminated or if operating the equipment under adverse operating conditions, included longer-than-usual operating hours. The calendar interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard time intervals must be applied during the warranty period.

Cleaning Fittings Before Lubrication

WARNING

Cleaning solvents may be toxic and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breath vapors. Keep away from heat or flame. Never smoke when using cleaning solvent. Failure to comply may result in serious injury or death to personnel.

If personnel become dizzy while using cleaning solvents, immediately get fresh air and medical help. If cleaning solvent contacts skin or clothes, flush with cold water. If cleaning solvent contacts eyes, immediately flush eyes with water and get medical attention. Failure to comply may result in serious injury or death to personnel.

Clean parts with cleaning solvent. Dry before lubricating.

Lubrication After Fording

If a fording operation occurs, lubricate all fittings below fording depth and check submerged gear boxes for presence of water.

Lubrication After High Pressure Washing

After a thorough washing, lubricate all grease fittings and oil can points outside and underneath trailer.

Corrosion Control

Refer to (WP 0001), Corrosion Prevention and Control (CPC), for appropriate corrosion control procedures.

Hard Time Lubrication Intervals

For equipment under manufacturer's warranty, hard time lubrication intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (e.g. longer than usual operating hours, extended idling periods, extreme dust).

EXPLANATION OF TABLE ENTRIES

Item Number - Numbers in this column are for reference. When completing DA Form 2404/DA Form 5988E (Equipment Inspection and Maintenance Worksheet), include the item number for the check/service indicating a fault. Item numbers appear in the order in which the checks/services are performed for the interval listed.

Interval - This column indicates when a procedure must be performed (i.e., Before, During, After, Monthly).

Item to Be Checked or Serviced - This column provides the item that is to be checked or serviced.

Procedure - This column describes the procedure that must be followed to ensure that the equipment is capable of performing its intended mission.

Equipment Not Ready/Available If - This column lists conditions that make the TMSS-MED not fully mission capable. If possible, fix the problem using the troubleshooting procedures and/or maintenance procedures in this manual. If not, document the items not able to be fixed on DA Form 2404 for the next level of maintenance. For further information on how to use this form, see DA PAM 750-8. Be sure to observe and annotate all special circumstances that appear/occur.

EXPLANATION OF TABLE ENTRIES - Continued

Other Entries - Be sure to observe and annotate all special circumstances that appear/occur.

NOTE

If the equipment must be kept in continuous operation, only perform those procedures that will not disturb operation. Complete checks and services when the equipment is shut down.

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
PMCS (TRAILER & SHELTER)

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

References
WP 0119 – WP 0130

Personnel Required
Two

Table 1. Maintainer Preventive Maintenance Checks and Services – Trailer and Shelter.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1	Monthly	**TRAILER**	**NOTE** Refer to (WP 0119 through WP 0130) for trailer maintenance procedures.	
			1. Check wheels and tires for damage, foreign objects, loose or missing lug nuts, or unusual tread wear. Verify that tire pressure is correct. Highway: 20 psi Off Road: 17 psi Replace tire if necessary.	Wheels/tires damaged, extreme wear, lug nuts missing/not properly tightened. Tires unserviceable.
			2. Check trailer brakes to include master cylinder. Ensure that trailer breaks are in proper working order.	Breaks/master cylinder not in proper working order.
			3. Check brake hoses. Ensure that hoses are not collapsed, swollen, excessively soft, or spongy. Ensure that no damage, to include cracks excessive wear is present. Check connections to ensure that no leakage of brake fluid, excessive corrosion, or other wear is present.	Brake hoses damaged, leaking, excessive cracking present.
			4. Check brake fluid. Ensure that brake fluid is full and is not contaminated. If necessary, add brake fluid.	Brake fluid reservoir low on fluid/leaking or fluid is contaminated.

Table 1. Maintainer Preventive Maintenance Checks and Services – Trailer and Shelter - Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
			NOTE The following step must be performed with the trailer connected to a vehicle.	
			5. Check brake lights for functionality.	
			WARNING When performing the following step, DO NOT attempt to pull trailer beyond point where cables, duct work, and other items would be damaged.	
			CAUTION Prior to performing the following step, ensure that dolly wheel assembly is raised, safety chain is engaged, and parking breaks are released.	
			6. Attempt to tow trailer with vehicle. Trailer should NOT drag.	Wheels are locked up/ do not turn.
			7. Check safety chains for insecure mounting, damage, corroded, or loose hardware. Replace/repair if necessary.	Safety chains loose, damaged, corroded, or missing.
			8. Check for missing or damaged, lens lights. Replace/repair if necessary.	Lens light or hardware loose, corroded, or missing.
			9. Check condition of skid plate/dolly wheel assembly for proper mounting to landing post or tongue jack. Repair or replace if necessary.	Skid plate/dolly wheel tongue jack missing or inoperative.
			10. Check crank handle for proper operation. Verify that no corrosion is present on mechanism. Grease if necessary.	Crank handle damaged, missing, or inoperative.
			11. Attempt to tow trailer with vehicle. Trailer should NOT drag.	Wheels are locked up/ do not turn.

Table 1. Maintainer Preventive Maintenance Checks and Services – Trailer and Shelter - Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
2		**SHELTER**		
	Monthly		**NOTE** Refer to (WP 0130) for Maintainer procedures applicable to the shelter.	
			1. Check interior and exterior covers, end caps, doors for excessive wear, cracks, or other damage. Repair as necessary.	Damaged beyond repair.
			2. Check for missing/damaged hubs, struts, risers, and other support components. Repair/replace as necessary.	Hubs, struts, risers missing or damaged beyond repair.
			3. Check wind lines for excessive wear or damage. Repair/replace as necessary.	Wind lines frayed, missing, or damaged beyond repair.
	Monthly	Light Set, Shelter	1. Check lamps. Verify that no visible damage is present. If necessary replace bulb.	
			2. Check fuse. Verify that fuse is good and properly installed. If necessary, replace fuse.	

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TRAILER & SHELTER MAINTENANCE INDEX

GENERAL

This section contains an index of repair/removal/replacement or maintenance procedures that may be needed during maintenance or repair of the TMSS-MED shelter by Maintainer personnel. Maintenance is limited to those failures that may be repaired at the Maintainer level. The index identifies the maintenance function, which is followed by a column that identifies the work package and page(s) where Maintainer level procedure(s) may be found. The index is provided to assist in the quick location of a procedure. The manual cannot list all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

Maintenance Function		Procedure
TRAILER		
1.	Trailer level removal/replacement	0119-2
2.	Safety chain removal/replacement	0119-3
3.	Tongue jack assembly removal/replacement	0119-4
4.	Lift sling removal/replacement	0120-2
5.	Stabilizer leg removal/replacement	0121-2
6.	Cargo net removal/replacement	0121-5
7.	Reflector removal/replacement	0122-2
8.	Ground stud removal/replacement	0122-4
9.	Lanyard assembly removal/replacement	0122-6
10.	Fire extinguisher bracket removal/replacement	0122-8
11.	Cargo restraint cage removal/replacement	0123-2
12.	Vehicle stop light lamp (incandescent) and blackout light removal/replacement/test	0124-2
13.	Vehicle stop light (incandescent) removal/replacement/test	0124-4
14.	Vehicle stop light (LED) removal/replacement/test	0124-6
15.	Vehicle stop light wiring harness (inter-vehicular cable) removal/replacement/test	0125-2
16.	Brake hub/drum removal/clean and inspect/replacement	0126-2
17.	Wheel cylinder removal/clean and inspect/replacement	0126-6
18.	Brakeshoe removal/clean and inspect/replacement	0126-9
19.	Backing plate removal/replacement	0126-13
20.	Brake adjustment	0126-15
21.	Master cylinder removal/replacement	0127-2
22.	Brake line removal/replacement	0127-4
23.	Bleed brake system	0127-8
24.	Brake actuator components removal/replacement	0128-4
25.	Brake actuator assembly removal/replacement	0128-9
26.	Hand brake assembly removal/inspect/replacement	0128-11
27.	Hand brake cable and sheath removal/replacement	0128-14
28.	Tire and wheel assembly service/removal/replacement	0129-2
LIGHTING		
29.	Fluorescent lamp removal/replacement	0130-2
30.	Fuse removal/replacement	0130-4

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TRAILER LEVEL, SAFETY CHAIN, AND TONGUE JACK

GENERAL

This work package provides information on the removal and replacement of the trailer level, safety chain, and tongue jack assembly. It consists of:

- Trailer level removal/replacement
- Safety chain removal/replacement
- Tongue jack assembly removal/replacement

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

TRAILER LEVEL REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Level

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked

REMOVAL

1. Remove and retain three screws (Figure 1, Item 2).
2. Remove and properly discard of level (Figure 1, Item 1).

END OF TASK

REPLACEMENT

1. Install level (Figure 1, Item 1) secure to trailer using three screws (Figure 1, Item 2).

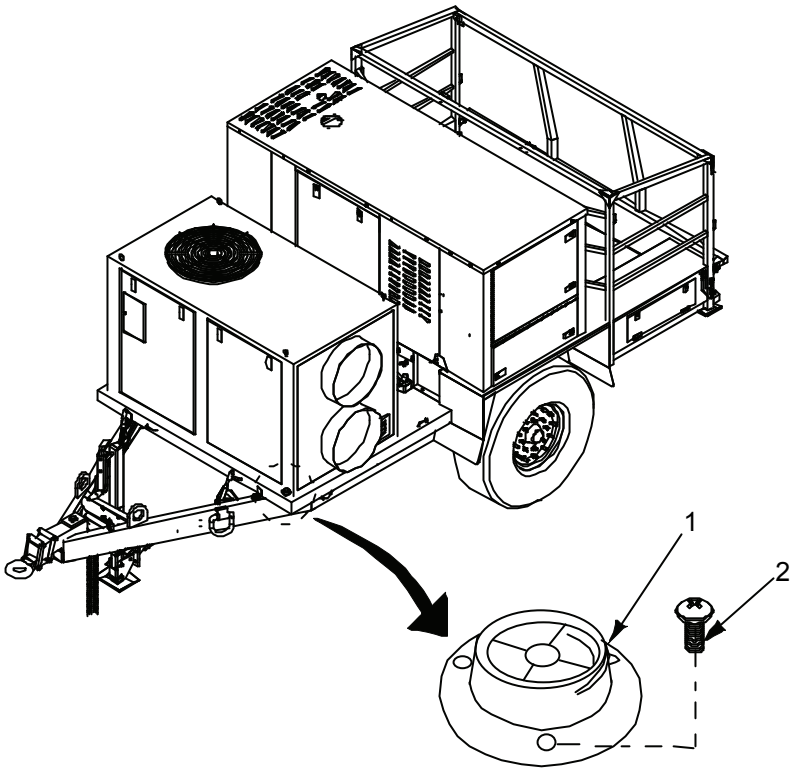


Figure 1. Trailer Level Removal/Replacement.

END OF TASK

SAFETY CHAIN REMOVAL/REPLACEMENT

INITIAL SETUP:

Materials/Parts
Safety chain
Pin (w/Retainer)

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked

REMOVAL

1. Identify safety chain (Figure 2, Item 1) requiring replacement.
2. Rotate locking ring (Figure 2, Item 2) and remove locking pin (Figure 2, Item 3).
3. Remove safety chain (Figure 2, Item 1) from slot in trailer frame.

END OF TASK

REPLACEMENT

1. Insert safety chain (Figure 2, Item 1) into slot in trailer frame.
2. Insert locking pin (Figure 2, Item 3) through safety chain (Figure 2, Item 1).
3. Secure safety chain (Figure 2, Item 1) by rotating locking ring (Figure 2, Item 2) over locking pin (Figure 2, Item 3).

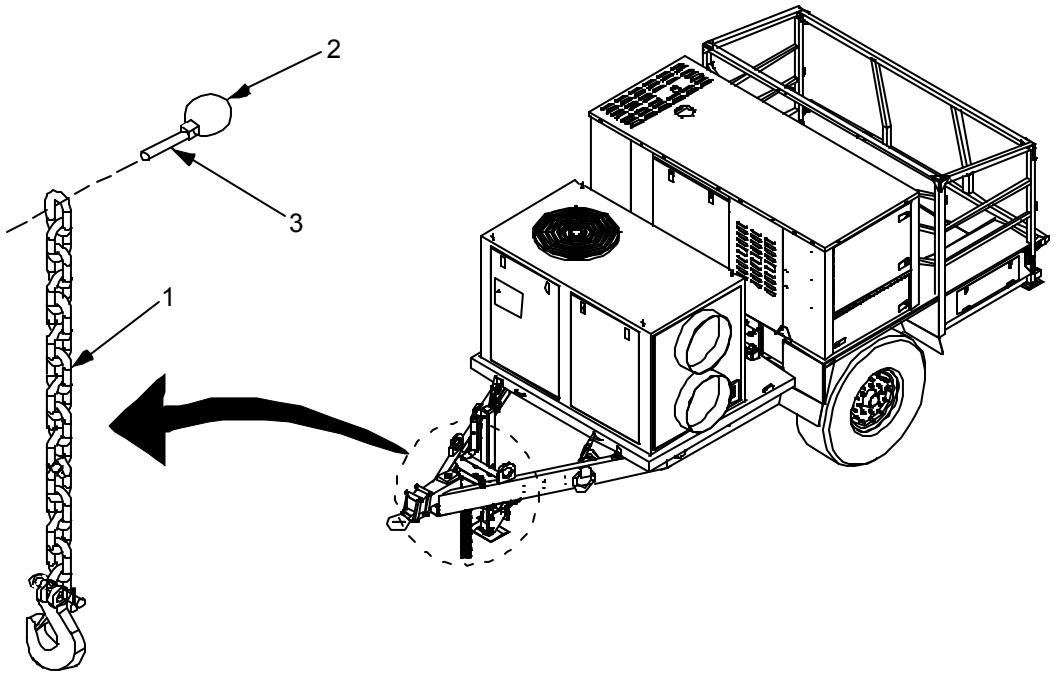


Figure 2. Safety Chain Removal/Replacement.

END OF TASK

TONGUE JACK ASSEMBLY REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Tongue jack assembly
Grease (WP 0168, Item 25)

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked

REMOVAL

1. Attach trailer to vehicle or stationary trailer stand.
2. Verify that both trailer wheels are chocked, hand brakes are locked and stabilizer leg not being changed is in its shortest positions.
3. Raise tongue jack assembly (Figure 3, Item 1) until skid plate assembly (Figure 3, Item 3) is off the ground.
4. Remove two mounting pins (Figure 3, Item 4) and remove skid plate assembly (Figure 3, Item 3).

NOTE

If replacing only the skid plate assembly (Figure 3, Item 3) by-pass step 5.

5. Remove four bolts (Figure 3, Item 2) and lock nuts (Figure 3, Item 5) from tongue jack assembly (Figure 3, Item 1)
6. Remove tongue jack assembly (Figure 3, Item 1).

END OF TASK

REPLACEMENT

NOTE

Ensure tongue jack assembly (Figure 3, Item 1) is compressed to the fully closed position.

1. Install tongue jack assembly (Figure 3, Item 1) and secure to trailer assembly with four bolts (Figure 3, Item 2) and lock nuts (Figure 3, Item 5).
2. Install skid plate assembly (Figure 3, Item 3) and secure to tongue jack assembly (Figure 3, Item 1) with two mounting pins (Figure 3, Item 4)

NOTE

If necessary, grease tongue jack assembly (Figure 3, Item 1).

3. Raise and lower tongue jack assembly (Figure 3, Item 1) to verify operation.

REPLACEMENT – Continued

4. Lower tongue jack assembly (Figure 3, Item 1) until the skid plate assembly (Figure 3, Item 3) on the ground.
5. Raise the trailer using the tongue jack assembly (Figure 3, Item 1), remove tow vehicle or trailer stand and level trailer.

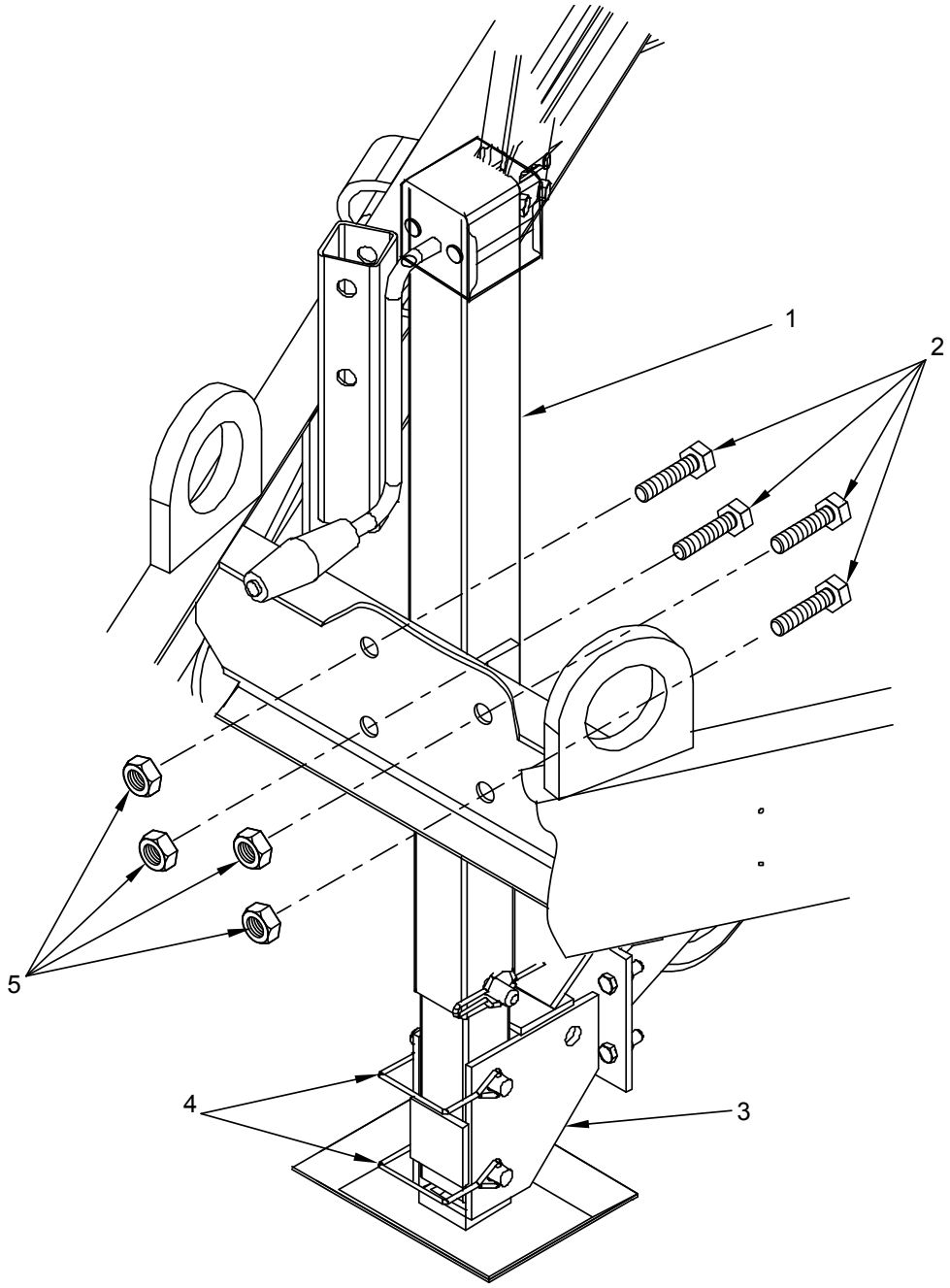


Figure 3. Tongue Jack Assembly Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TRAILER LIFT SLING

GENERAL

This work package provides information on the removal and replacement of the front and rear trailer lift slings.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

LIFT SLING REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Common No.1 shop set (WP 0165, Item 5)

Materials/Parts
Lift sling

Personnel Required
One

References
WP 0005

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Prior to performing the following procedure ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

CAUTION

Prior to performing the following procedure ensure that TMSS-MED is out of service. No power cables or duct should be connected to the ECU or Genset. Failure to observe this caution could result in serious damage to the TMSS-MED trailer and/or its contents.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF. (WP 0005, Genset Shut Down Procedure).

NOTE

If replacing trailer bed lift sling, remove equipment from trailer bed.

3. Remove two hex bolts (Figure 1, Item 1) from lift sling (Figure 1, Item 2).

NOTE

Front lift slings have a detachable mounting block (Figure 1, Item 4) within the trailer frame. Secure mounting block (Figure 1, Item 4) when removing hardware and set aside.

Rear lift slings have a permanent mounting block attached beneath trailer bed (Figure 1, Item 3).

4. Pull lift sling (Figure 1, Item 2) up from trailer superstructure.

END OF TASK

REPLACEMENT

1. Position lift sling (Figure 1, Item 2) over bolt holes in trailer superstructure.
2. Install two hex bolts (Figure 1, Item 1) into lift sling (Figure 1, Item 2) and through trailer superstructure.

NOTE

Front lift slings have a detachable mounting block (Figure 1, Item 4). Align mounting block with hardware within frame.

Rear lift slings have a permanent mounting block attached beneath trailer bed (Figure 1, Item 3).

3. Tighten bolts (Figure 1, Item 1).
4. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
5. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

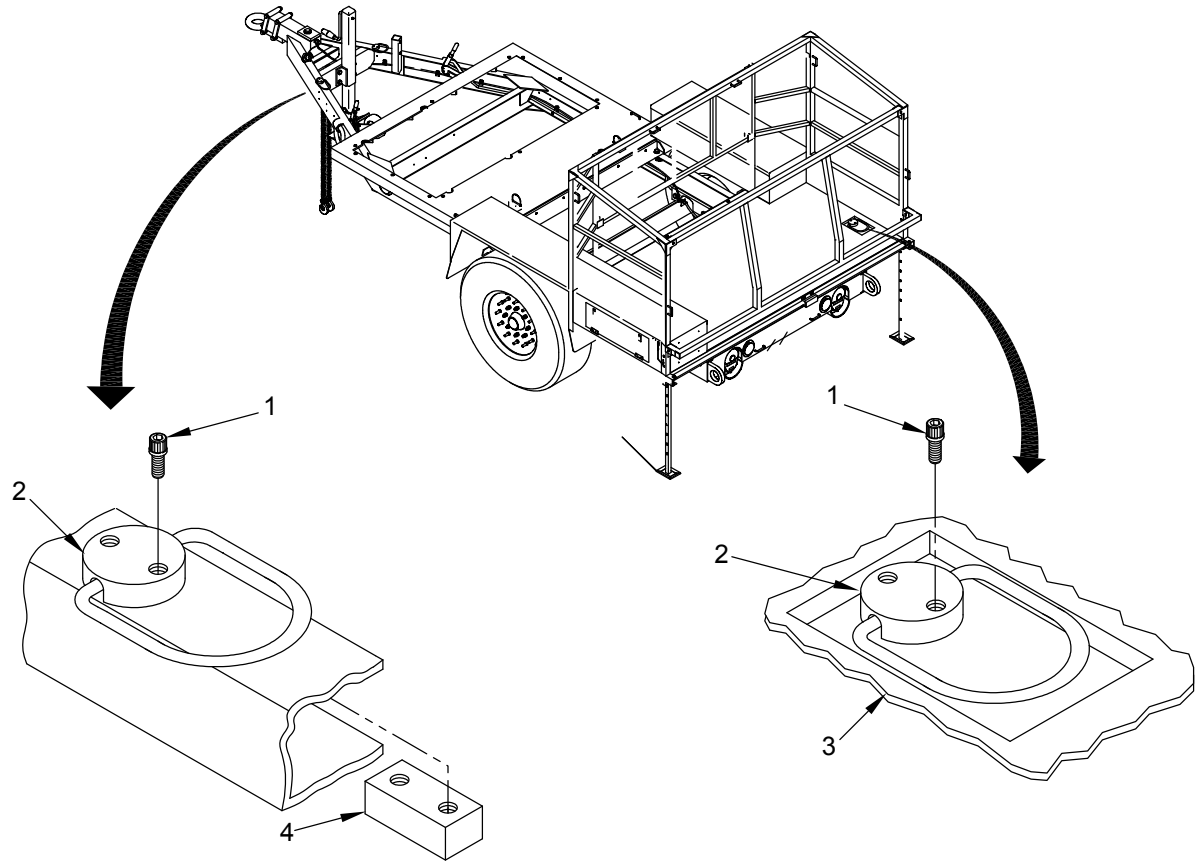


Figure 1. Lift Sling Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TRAILER STABILIZER LEG AND CARGO NET

GENERAL

This work package provides information on the removal and replacement of the trailer stabilizer leg and cargo net. It consists of:

- Stabilizer leg removal/replacement
- Cargo net removal/replacement

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

STABILIZER LEG REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
5 ton floor jack

Materials/Parts
Stabilizer leg

Personnel Required
One

References
WP 0005

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

WARNING

When the following procedure is being performed, the trailer is in a very unstable position. This procedure should be performed in a timely manner and the trailer should not be left unattended. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

Personnel performing this procedure should have another person near by incase an adverse situation occurs. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Prior to performing the following procedure ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

CAUTION

Prior to performing the following procedure ensure that TMSS-MED is out of service. No power cables or duct should be connected to the ECU or Genset. Failure to observe this caution could result in serious damage to the TMSS-MED trailer and/or its contents.

REMOVAL

1. Remove all loose items from trailer and cargo area.
2. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
3. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF. (WP 0005, Genset Shut Down Procedure).
4. Verify that ducts are disconnected from ECU and all cables are disconnected from Genset and ECU.

REMOVAL – Continued

5. Raise both stabilizer legs (Figure 1, Item 4) to the fully stowed position.

6. Verify that opposite trailer wheel is chocked and hand brakes are locked.

7. Ensure skid plate (Figure 1, Item 6) is in the down position and dolly wheel is facing rear of trailer.

8. Remove pin (Figure 1, Item 7) and raise tongue jack assembly (Figure 1, Item 1) to highest position to lower tongue assembly to lowest point.

9. Position floor jack (Figure 1, Item 5) beneath trailer axle on same side as stabilizer leg being replaced.

10. Remove two locking pins (Figure 1, Item 2) that secure the trailer stabilizer leg (Figure 1, Item 4) being replaced and lower stabilizer leg as far as possible.

11. Raise floor jack (Figure 1, Item 5) until sufficient height is attained to remove stabilizer leg (Figure 1, Item 4) from receptacle (Figure 1, Item 3) on trailer.

END OF TASK

REPLACEMENT

1 Insert stabilizer leg (Figure 1, Item 4) into receptacle (Figure 1, Item 3) on trailer and raise stabilizer leg to the fully stowed position.

2. Insert two locking pins (Figure 1, Item 2) and secure stabilizer leg (Figure 1, Item 4).

3. Lower and remove floor jack (Figure 1, Item 5).

4. Adjust the tongue jack assembly (Figure 1, Item 1) and stabilizer legs (Figure 1, Item 4) to appropriate operational height. Replace pin (Figure 1, Item 7) in tongue jack assembly (Figure 1, Item 1).

5. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

6. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

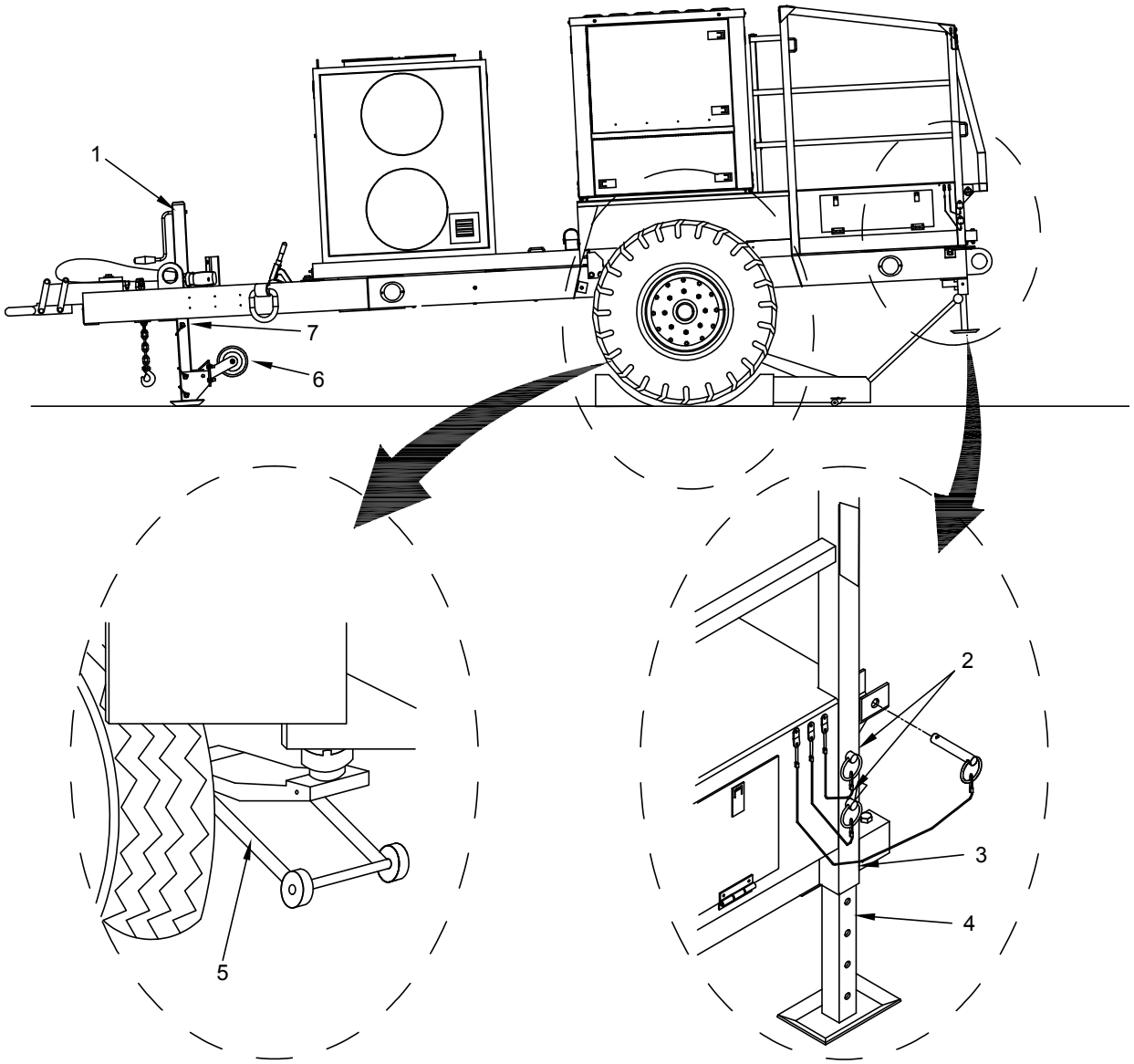


Figure 1. Stabilizer Leg Removal/Replacement.

END OF TASK

CARGO NET REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Cargo net

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked

REMOVAL

1. Disconnect six quick disconnects (Figure 2, Item 9) that secure cargo net (Figure 2, Item 8).
2. Remove and retain two bolts (Figure 2, Item 1), four flat washers (Figure 2, Item 3), and two lock nuts (Figure 2, Item 4) that secure mounting pole (Figure 2, Item 2) to trailer frame.
3. Remove and retain four bolts (Figure 2, Item 7), eight flat washers (Figure 2, Item 6), and four lock nuts (Figure 2, Item 10) that secure center bracket (Figure 2, Item 5) to trailer frame.
4. Remove and retain center bracket (Figure 2, Item 5).
5. Remove mounting pole (Figure 2, Item 2) and cargo net (Figure 2, Item 8) from trailer frame.
6. Remove cargo net (Figure 2, Item 8) from mounting pole (Figure 2, Item 2). Retain mounting pole (Figure 2, Item 2) and properly discard cargo net (Figure 2, Item 8).

END OF TASK

REPLACEMENT

1. Insert mounting pole (Figure 2, Item 2) into loops on cargo net (Figure 2, Item 8).
2. Secure mounting pole (Figure 2, Item 2) and cargo net (Figure 2, Item 8) to trailer frame with two bolts (Figure 2, Item 1), four flat washers (Figure 2, Item 3), and two lock nuts (Figure 2, Item 4).
3. Install center bracket (Figure 2, Item 5) to trailer frame and secure with four bolts (Figure 2, Item 7), eight flat washers (Figure 2, Item 6), and four lock nuts (Figure 2, Item 10).
4. Secure cargo net (Figure 2, Item 8) to trailer with six quick disconnects (Figure 2, Item 9).

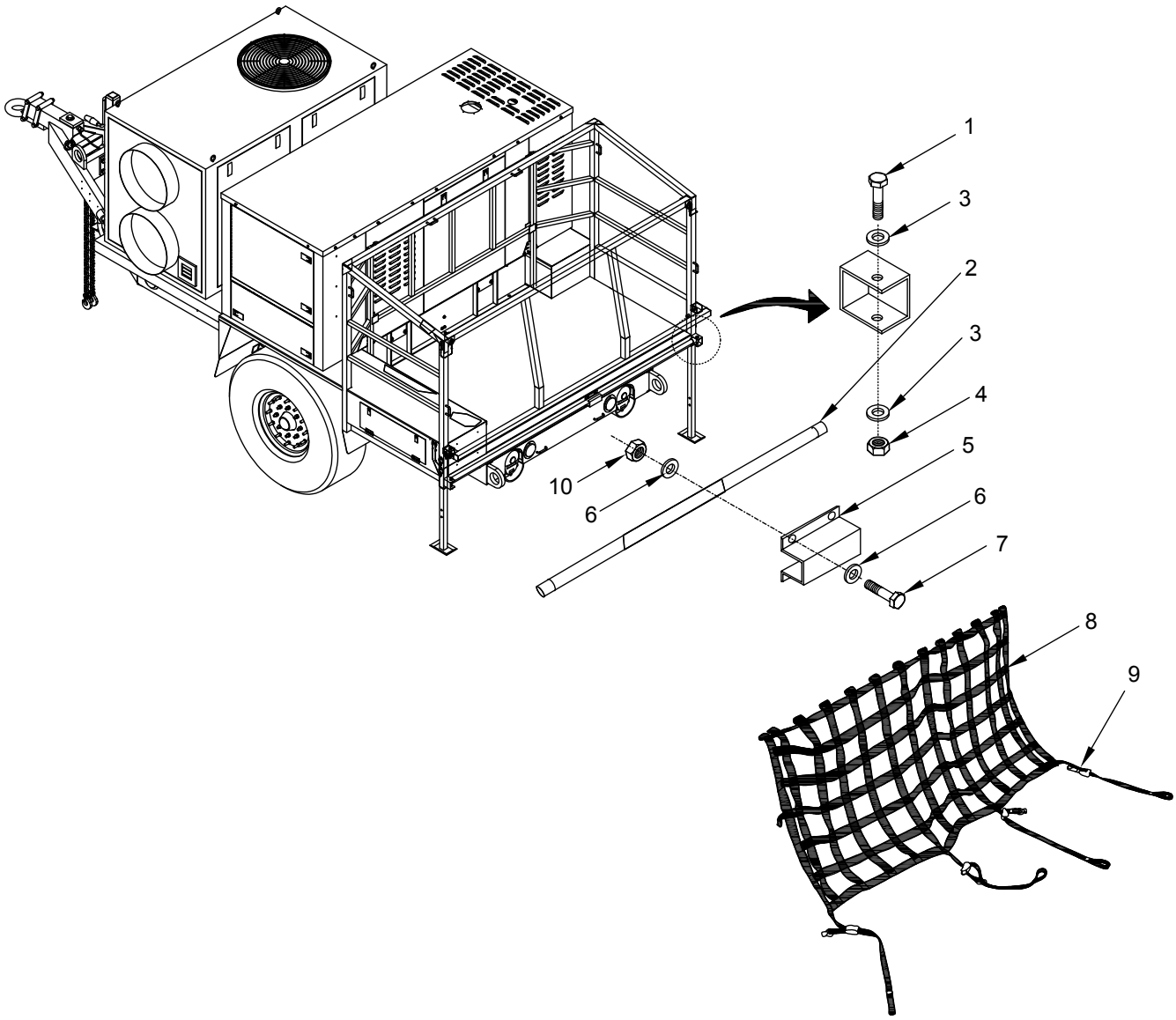


Figure 2. Cargo Net Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TRAILER BASIC

GENERAL

This work package provides information on the removal and replacement of the following components:

- Reflector removal and replacement
- Ground stud removal and replacement
- Lanyard assembly removal and replacement
- Fire extinguisher bracket removal and replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

REFLECTOR REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Reflector

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

CAUTION

Be aware of wiring harness behind reflectors when drilling or damage may result.

NOTE

This procedure applies to all reflectors at various locations of the trailer.

REMOVAL

1. Unload any ancillary devices from trailer that will interfere with replacement of reflector.
2. Drill out the center of the two rivets (Figure 1, Item 2) securing reflector (Figure 1, Item 3) to the trailer superstructure (Figure 1, Item 1) using a 3/16" drill bit.
3. Remove reflector (Figure 1, Item 3).

END OF TASK

REPLACEMENT

1. Insert new rivets (Figure 1, Item 4) through reflector (Figure 1, Item 3) and through mounting holes in the superstructure of the trailer (Figure 1, Item 1).
2. Using rivet gun, lock rivets (Figure 1, Item 4) into place.
3. Reload ancillary devices in trailer.

REPLACEMENT – Continued

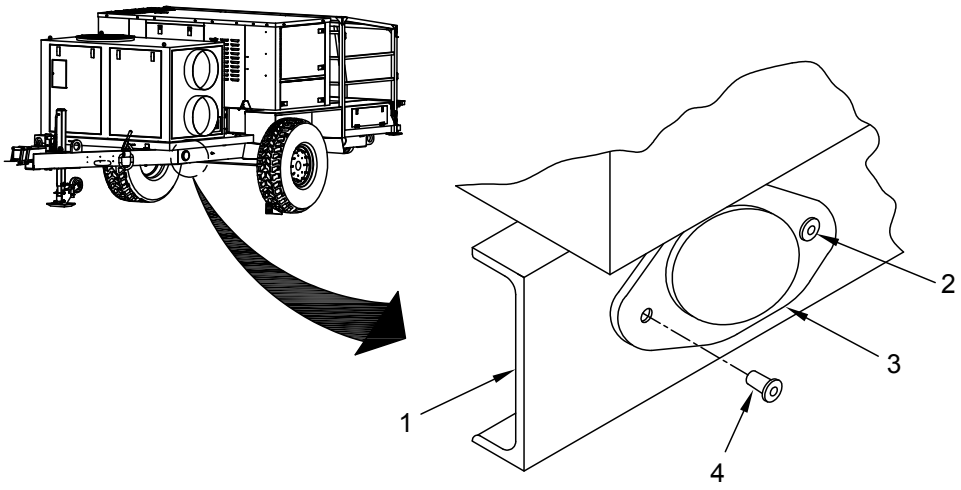


Figure 1. Reflector Removal/Replacement.

END OF TASK

GROUND STUD REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

Materials/Parts
Ground bolt and hardware

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

REMOVAL

1. Remove wing nut (Figure 2, Item 7), nut (Figure 2, Item 6), lock washer (Figure 2, Item 5), and finishing washer (Figure 2, Item 4) from ground bolt (Figure 2, Item 1).
2. Remove ground bolt (Figure 2, Item 1), washer (Figure 2, Item 2), and ground wire(s) (Figure 2, Item 8) from trailer superstructure (Figure 2, Item 3).

END OF TASK

REPLACEMENT

NOTE

Prior to beginning the following step, ensure area around hole is free of paint, grease, dirt, and other debris that would prevent a good electrical connection.

1. Insert ground bolt (Figure 2, Item 1), washer (Figure 2, Item 2), and ground wire(s) (Figure 2, Item 8) to trailer superstructure (Figure 2, Item 3).
2. Install wing nut (Figure 2, Item 7), nut (Figure 2, Item 6), lock washer (Figure 2, Item 5), and finishing washer (Figure 2, Item 4) to ground bolt (Figure 2, Item 1).

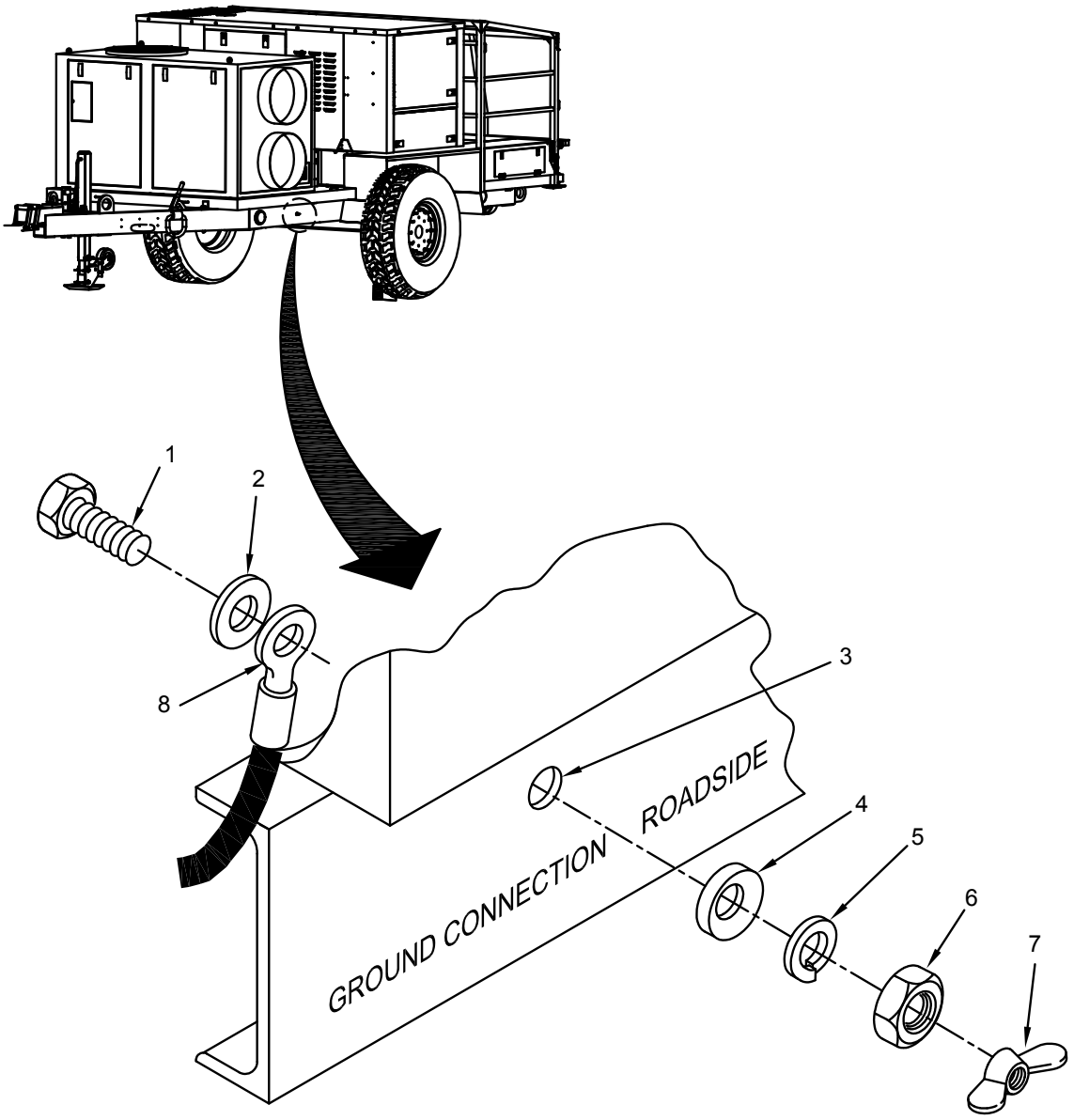


Figure 2. Ground Stud Removal/Replacement.

END OF TASK

LANYARD ASSEMBLY REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Lanyard assembly

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

REMOVAL

1. Unload any ancillary devices from trailer that will interfere with replacement of lanyard assembly.
2. Drill out center of lanyard rivet (Figure 3, Item 1) using a 3/16" drill bit.
3. Remove and discard rivet (Figure 3, Item 1). Remove lanyard assembly (Figure 3, Item 2).

END OF TASK

REPLACEMENT

1. Using rivet gun, place rivet through lanyard assembly (Figure 3, Item 2) hole and hole in trailer structure.
2. Lock down rivet (Figure 3, Item 1).
3. Reload ancillary devices in trailer.

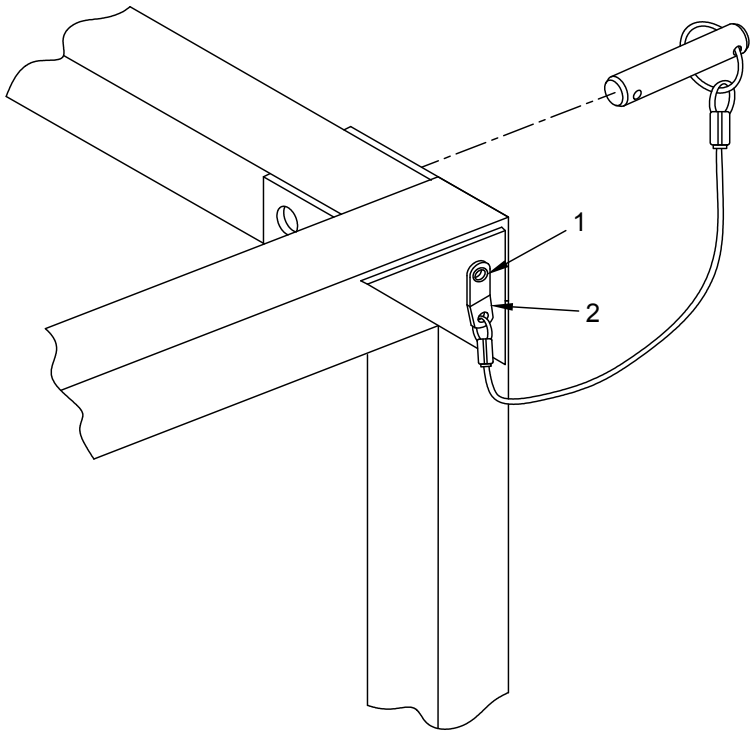


Figure 3. Lanyard Assembly Removal/Replacement.

END OF TASK

FIRE EXTINGUISHER BRACKET REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Fire extinguisher bracket

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

CAUTION

Be aware of wiring harness behind bracket when drilling or damage may result.

REMOVAL

1. Unload any ancillary devices from trailer that will interfere with replacement of fire extinguisher bracket.
2. Remove fire extinguisher (Figure 4, Item 6) from bracket (Figure 4, Item 3).
3. Drill out four rivets (Figure 4, Item 5) from fire extinguisher bracket (Figure 4, Item 3) using a drill with 3/16" bit.
5. Remove and discard fire extinguisher bracket (Figure 4, Item 3).

END OF TASK

REPLACEMENT

1. Position fire extinguisher bracket (Figure 4, Item 3) over Genset enclosure mounting holes (Figure 4, Item 4) and insert four rivets (Figure 4, Item 2).

NOTE

To ensure proper alignment, insert all four rivets through bracket and into Genset enclosure holes before locking down rivets.

2. Lock down four rivets (Figure 4, Item 2).
3. Ensure adhesive cushions (Figure 4, Item 1) are placed at contact points between bracket (Figure 4, Item 3) and fire extinguisher (Figure 4, Item 6).
4. Secure fire extinguisher (Figure 4, Item 6) in bracket (Figure 4, Item 3).
5. Reload ancillary devices in trailer.

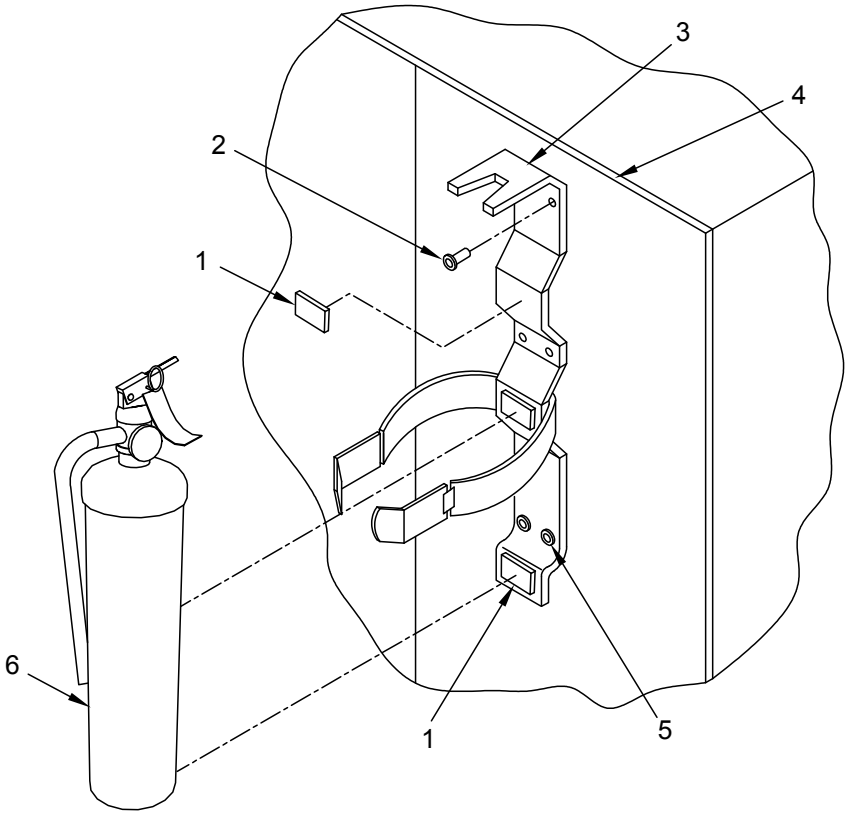


Figure 4. Fire Extinguisher Bracket Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TRAILER CARGO RESTRAINT CAGE

GENERAL

This work package provides information on the removal and replacement of the trailer cargo restraint cage

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

CARGO RESTRAINT CAGE REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Cage

Personnel Required
Two

References
WP 0005

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Prior to performing the following procedure ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

CAUTION

Prior to performing the following procedure ensure that TMSS-MED is out of service. No power cables or duct should be connected to the ECU or Genset. Failure to observe this caution could result in serious damage to the TMSS-MED trailer and/or its contents.

REMOVAL

1. Remove all loose items from trailer and cargo area.
2. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
3. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF. (WP 0005, Genset Shut Down Procedure).
4. Verify that ducts are disconnected from ECU and all cables are disconnected from Genset and ECU.
5. Attach trailer to vehicle or stationary trailer stand.
6. Verify that both trailer wheels are chocked and hand brakes are locked.

REMOVAL – Continued

NOTE

Genset and ECU removed for clarity. It is not necessary to remove the Genset or ECU to replace a cage section.

7. Remove retaining pins as applicable to the section of cage that will be replaced, see (Figure 1).
8. Remove cage section.

END OF TASK

REPLACEMENT

1. Install cage section.
2. Insert retaining pins as applicable to the section of cage being replaced, see (Figure 1).
3. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
4. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

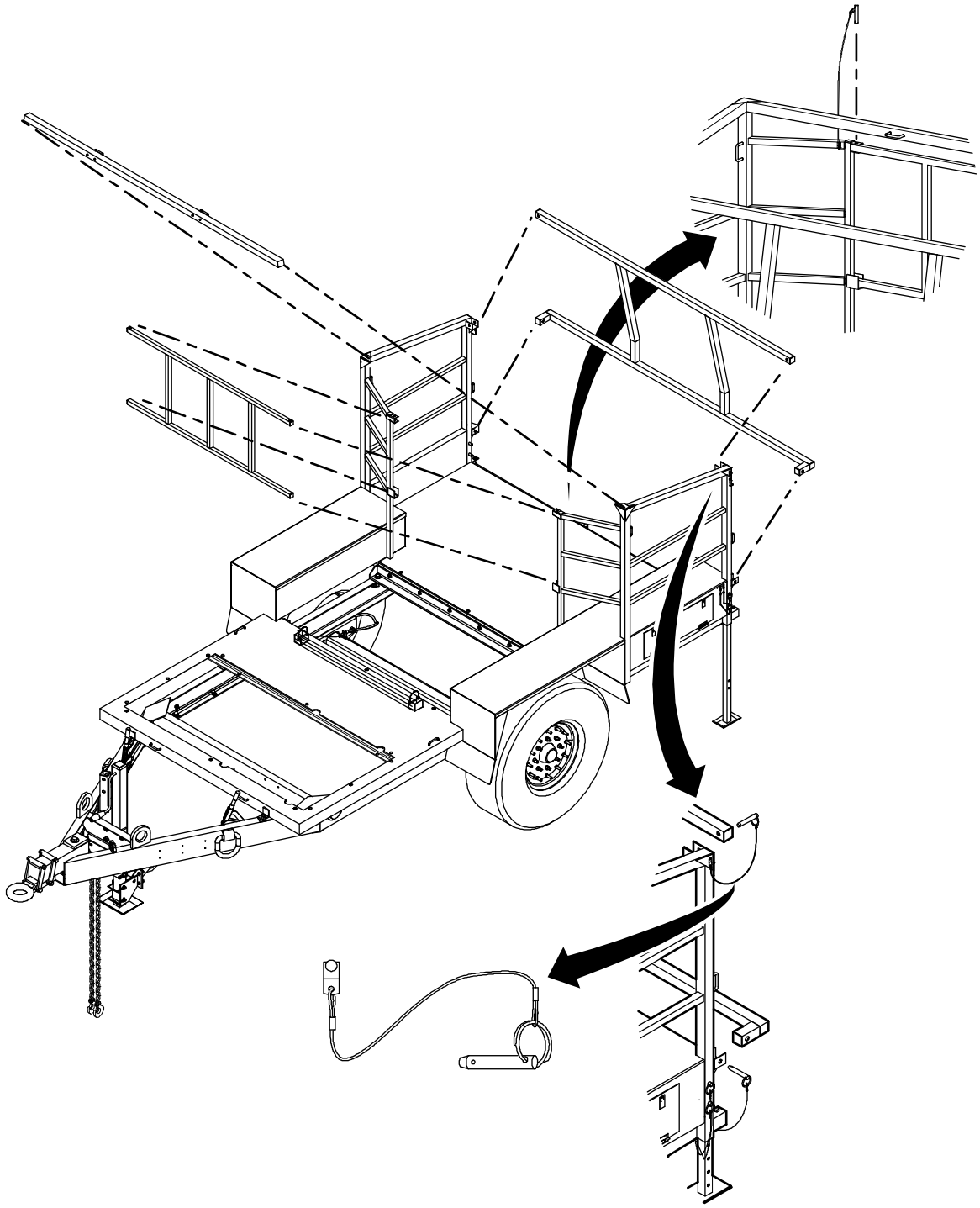


Figure 1. Cargo Restraint Cage Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TRAILER VEHICLE STOP LIGHT

GENERAL

This work package provides information on the service, removal and replacement of the vehicle stop light and inter-vehicular cable. It consists of:

- Stop light, vehicle, bulb (incandescent) removal/replacement/test
- Stop light vehicle (incandescent) removal/replacement/test
- Stop light vehicle (LED) removal/replacement/test

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

VEHICLE STOP LIGHT LAMP (INCANDESCENT) AND BLACKOUT LIGHT REMOVAL/REPLACEMENT/TEST

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Lamp incandescent
Blackout lamp

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked

REMOVAL

1. Remove six screws (Figure 1, Item 4) that secures lens (Figure 1, Item 5). Remove lens (Figure 1, Item 5) and o-ring gasket (Figure 1, Item 3).
2. Remove and properly discard incandescent lamp(s) (Figure 1, Items 1 and 2).
3. Remove and properly discard blackout tail light (Figure 1, Item 6) and blackout stop light (Figure 1, Item 7).

END OF TASK

REPLACEMENT

1. Install incandescent lamp(s) (Figure 1, Items 1 and 2).
2. Install blackout tail light (Figure 1, Item 6) and blackout stop light (Figure 1, Item 7).

NOTE

Inspect o-ring (Figure 1, Item 3). If o-ring is damaged order new lens (Figure 1, Item 5).

3. Install lens (Figure 1, Item 5) and secure using six screws (Figure 1, Item 4).

END OF TASK

TEST

1. Connect inter-vehicular cable to tow vehicle and vehicle quick disconnect.
2. Have driver turn on running lights, observe that trailer running lights activate.
3. While driver pushes down on brake pedal, observe that trailer brake lights activate.
4. While driver activates turn signals and hazard lights, observe that turn signal and hazard light on trailer activate.
5. While driver activates black-out drive lights, observe that trailer blackout lights activate.
6. If any of the above steps fail, troubleshoot system.

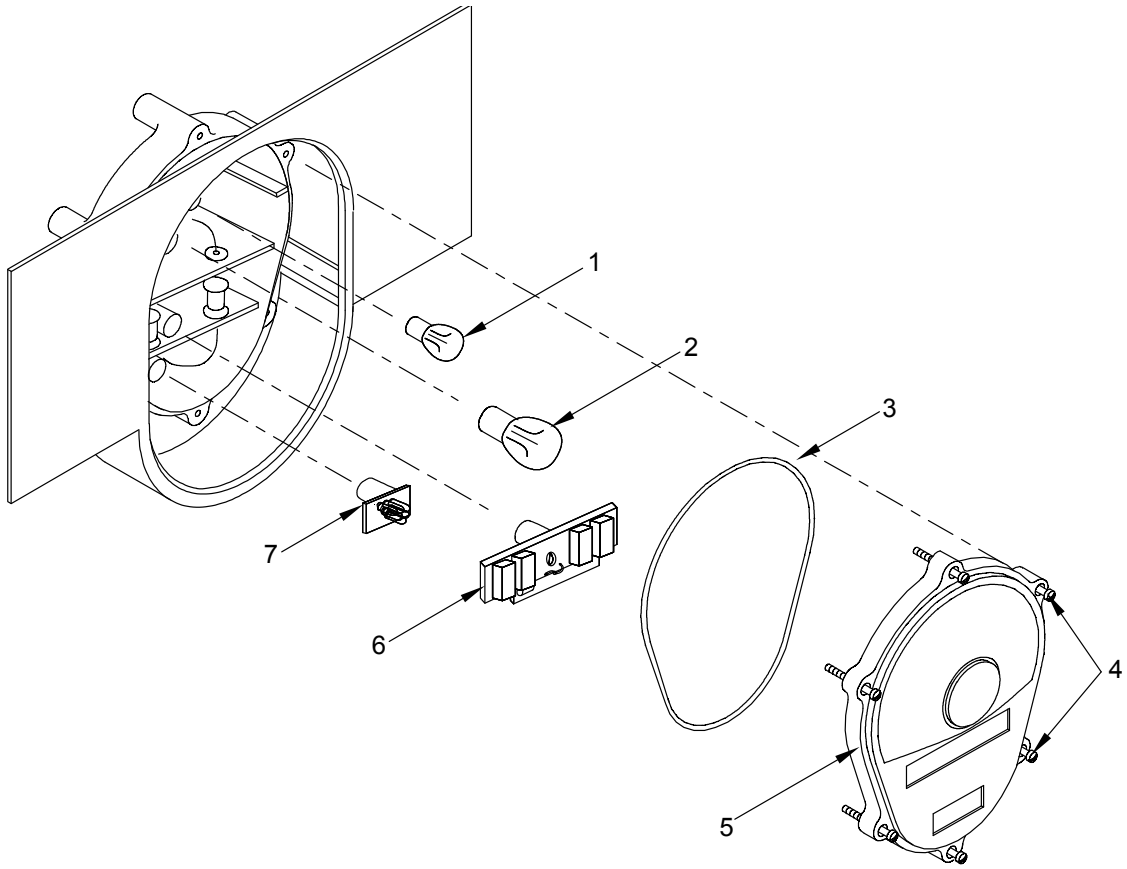


Figure 1. Vehicle Stop Light, Lamp (Incandescent) and Blackout Light Removal/Replacement.

END OF TASK

VEHICLE STOP LIGHT (INCANDESCENT) REMOVAL/REPLACEMENT/TEST

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Vehicle stop light
Strap tie (WP 0168, Items 55 to 57)

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked

CAUTION

There are two different types of stop light assemblies, incandescent and LED. The incandescent stop light will only be issued until the supply runs out. If you have to replace the incandescent style vehicle stop light with a LED style stop light you MUST replace the assembly cable which connects these lights to the vehicle. Before beginning this procedure, make sure you have all necessary parts.

REMOVAL

1. Remove two strap ties that secure the vehicle stop light connectors (Figure 2, Items 2 and 6).
2. Disconnect stop light pig-tail (Figure 2, Item 6) from the cable assembly (Figure 2, Item 3).
3. Remove and retain two bolts (Figure 2, Item 4) and flat washers (Figure 2, Item 5) from rear of the vehicle stop light assembly (Figure 2, Item 1).
4. Remove and properly discard vehicle stop light assembly (Figure 2, Item 1).

END OF TASK

REPLACEMENT

1. Feed stop light pig-tail (Figure 2, Item 6) through trailer and insert vehicle stop light assembly (Figure 2, Item 1).
2. Secure vehicle stop light assembly (Figure 2, Item 1) to trailer using two bolts (Figure 2, Item 4) and flat washers (Figure 2, Item 5).
3. Connect stop light pig-tail (Figure 2, Item 6) to cable assembly (Figure 2, Item 3).
4. Secure connection using two strap ties. Trim off excess.

END OF TASK

TEST

1. Connect inter-vehicular cable to tow vehicle and vehicle quick disconnect.
2. Have driver turn on running lights, observe that trailer running lights activate.

TEST – Continued

3. While driver pushes down on brake pedal, observe that trailer brake lights activate.
4. While driver activates turn signals and hazard lights, observe that turn signal and hazard light on trailer activate.
5. While driver activates black-out drive lights, observe that trailer blackout lights activate.
6. If any of the above steps fail troubleshoot system.

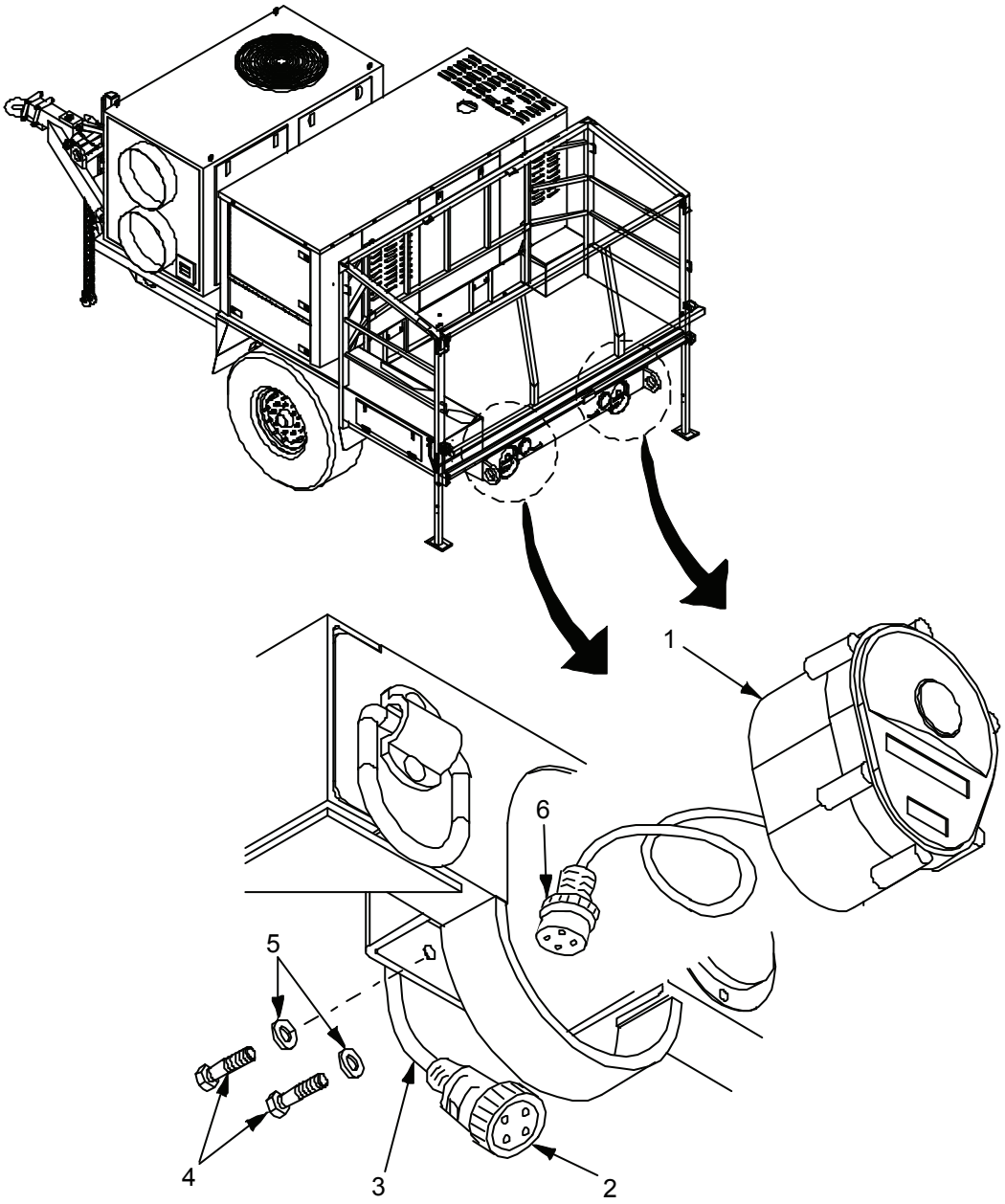


Figure 2. Vehicle Stop Light (Incandescent) Removal/Replacement.

END OF TASK

VEHICLE STOP LIGHT (LED) REMOVAL/REPLACEMENT/TEST

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Vehicle stop light
Strap tie (WP 0168, Items 55 to 57)

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked

REMOVAL

CAUTION

There are two different types of stop light assemblies, incandescent and LED. The incandescent stop light will only be issued until the supply runs out. If you have to replace the incandescent style vehicle stop light with a LED style stop light you MUST replace the assembly cable which connects these lights to the vehicle. Before beginning this procedure make sure you have all necessary parts.

NOTE

The following procedure applies to vehicles with ID beginning with 26-11863E-009.

When performing the following steps, be observant of trailer and cable assembly (Figure 3, Item 2) or stop light pig tail (Figure 3, Item 4).

1. Remove two strap ties that secure the vehicle stop light connectors on cable assembly (Figure 3, Item 2) and stop light pig tail (Figure 3, Item 4).

NOTE

Prior to performing the following step, inspect all connectors. Verify that all connectors are properly tagged and identified.

2. Disconnect stop light pig-tail (Figure 3, Item 4) from the cable assembly (Figure 3, Item 2).

3. Remove and retain two bolts (Figure 3, Item 1) and flat washers (Figure 3, Item 6) and ground connection (Figure 3, Item 5) from rear of the vehicle stop light assembly (Figure 3, Item 3).

4. Remove and properly discard vehicle stop light assembly (Figure 3, Item 3).

END OF TASK

REPLACEMENT

1. Feed stop light pig-tail (Figure 3, Item 4) through trailer and insert vehicle stop light assembly (Figure 3, Item 3).

NOTE

When performing the following step, make sure that area where ground cable (Figure 3, Item 5) is free and clear of all paint, grease, dirt or other Items which may prevent good electrical connection.

2. Secure vehicle stop light assembly (Figure 3, Item 3) and ground cable (Figure 3, Item 5) to trailer using two bolts (Figure 3, Item 1) and flat washers (Figure 3, Item 6).

3. Connect stop light pig-tail (Figure 3, Item 4) to cable assembly (Figure 3, Item 2).

4. Secure connection using two strap ties. Trim off excess.

END OF TASK

TEST

1. Connect inter-vehicular cable to tow vehicle and vehicle quick disconnect.

2. Have driver turn on running lights, observe that trailer running lights activate.

3. While driver pushes down on brake pedal, observe that trailer brake lights activate.

4. While driver activates turn signals and hazard lights, observe that turn signal and hazard light on trailer activate.

5. While driver activates black-out drive lights, observe that trailer blackout lights activate.

6. If any of the above steps fail troubleshoot system.

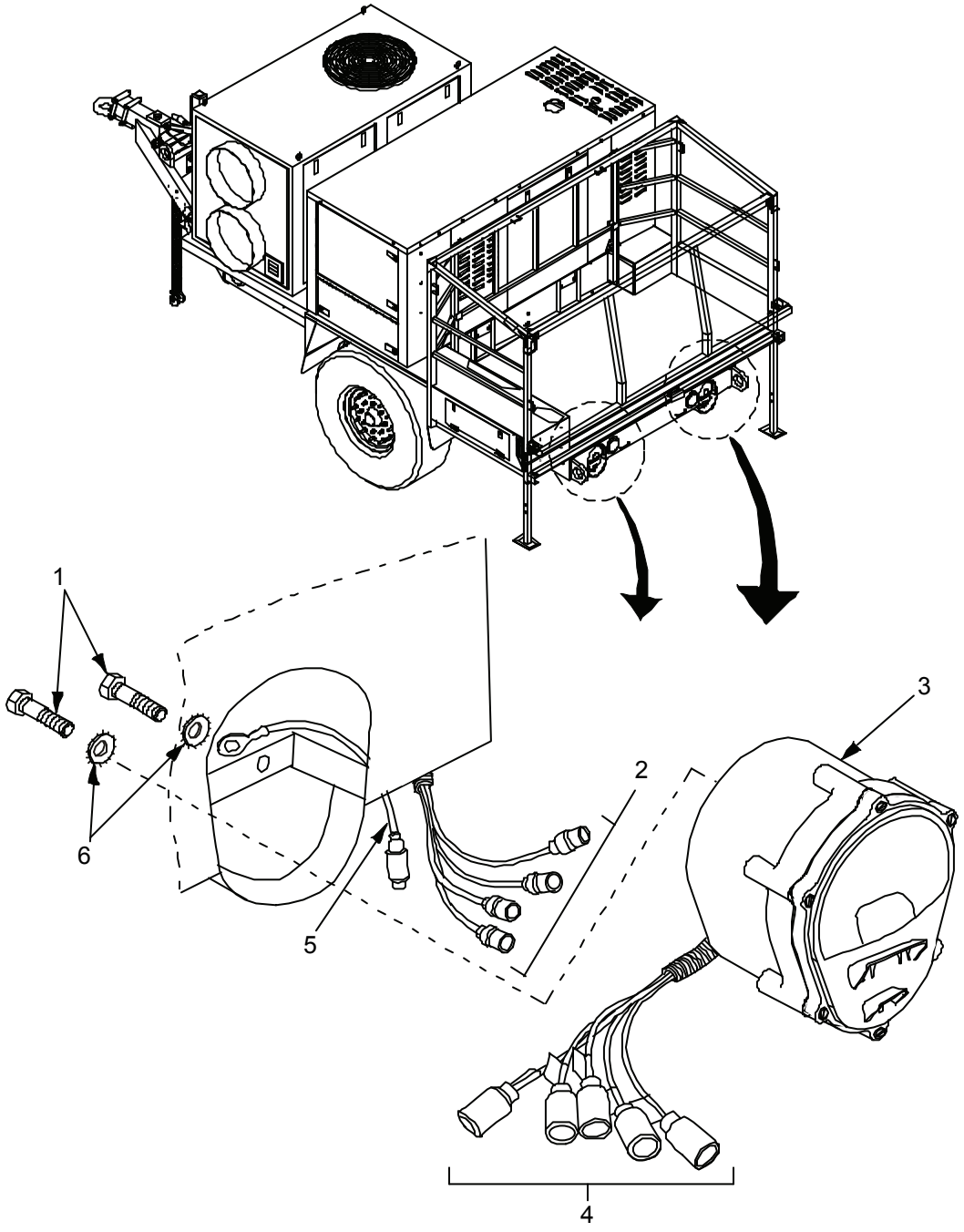


Figure 3. Vehicle Stop Light (LED) Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TRAILER INTER-VEHICULAR CABLE

GENERAL

This work package provides information on the service, removal and replacement of the vehicle stop light and inter-vehicular cable. It consists of:

- Inter-vehicular cable removal/replacement/test

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

VEHICLE STOP LIGHT WIRING HARNESS (INTER-VEHICULAR CABLE) REMOVAL/REPLACEMENT/TEST

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Cable assembly, special purpose, electrical
Strap tie (WP 0168, Items 55 to 57)

Personnel Required
One

References
WP 0005

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
BATTERY SWITCH set to OFF

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

NOTE

There are two different types of cables depending upon the type of stop light assembly present on the trailer. Before beginning this procedure make sure inter-vehicular cable assembly is the correct one.

Trailers with ID numbers up to 26-11863D-008 were manufactured with the incandescent style of vehicle stop light and cable assembly.

Trailers with ID numbers 26-11863E-009 or up were manufactured with the LED style of vehicle stop light and cable assembly.

The old style vehicle stop light and inter-vehicular cable will only be issued until supplies are depleted. If you replace either (cable assembly for vehicle stop lights) you may have to order and replace both.

Prior to performing the following procedure, verify that inter-vehicular cable is bad. Using a multimeter, measure continuity of cable assembly. If readings are 5 ohms or less cable is good. (See Table 1 for connections.)

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF. (WP 0005, Genset Stop Procedure).

NOTE

Prior to performing step, ensure that all electrical connections on both the cable assembly being installed and the mating connections on the vehicle stop lights are properly identified. If cable markings are missing or illegible properly mark connections.

REMOVAL – Continued

2. Remove ten self-locking nuts (Figure 1, Item 5) that secure cable clamps (Figure 1, Item 3)/ inter-vehicular cable (Figure 1, Item 6) to mounting studs (Figure 1, Item 2) on trailer frame (Figure 1, Item 1). Retain self-locking nuts (Figure 1, Item 5).

3. Disconnect ground wire (Figure 1, Item 4) from mounting stud (Figure 1, Item 2).

4. Remove ten cable clamps (Figure 1, Item 3) that secure inter-vehicular cable (Figure 1, Item 6) to trailer frame (Figure 1, Item 1).

NOTE

When performing the following steps, be observant of vehicle stop light assembly. Do not cut or damage associated pig-tail.

5. Cut strap ties from vehicle stop light assembly wiring connectors.

6. Disconnect inter-vehicular cable (Figure 1, Item 6) from pigtail of vehicle stop light assemblies.

7. Cut strap tie securing excess cable.

8. Pull inter-vehicular cable (Figure 1, Item 6) through feed through hole in frame and through opening in front of trailer frame. Discard inter-vehicular cable (Figure 1, Item 6).

END OF TASK

REPLACEMENT

NOTE

When performing the following steps, be observant of trailer and cable assembly. Do not cut or damage inter-vehicular cable (Figure 1, Item 6).

Leave approximately 5 ½ feet of inter-vehicular cable (Figure 1, Item 6) to allow electrical connection to towing vehicle.

1. Feed inter-vehicular cable (Figure 1, Item 6) through opening in front of trailer frame (Figure 1, Item 1).

2. Route cable assembly (Figure 1, Item 6) along curbside of trailer frame (Figure 1, Item 1). Be observant of ten mounting studs (Figure 1, Item 2).

3. Feed inter-vehicular cable (Figure 1, Item 6) through opening in center of trailer frame

NOTE

When performing the following step, do not attach cable clamps (Figure 1, Item 3) to rear of trailer frame (Figure 1, Item 1).

4. Starting at front of trailer frame (Figure 1, Item 1), install seven of the ten cable clamps (Figure 1, Item 3). Secure cable clamps (Figure 1, Item 3) to mounting studs (Figure 1, Item 2) with self-locking nuts (Figure 1, Item 5).

REPLACEMENT – Continued

NOTE

When performing the following step, do not force connections damage to cable/ vehicle stop light assembly could occur. If connectors will not mate, inspect both connections for bent pins, keys that do not mate, or other damage.

5. Make electrical connections between inter-vehicular cable (Figure 1, Item 6) and pig-tails on vehicle stop lights (see Table 1).

6. Install cable clamp (Figure 1, Item 3) and ground terminal (Figure 1, Item 4) and secure with self locking nut (Figure 1, Item 5) to stud (Figure 1, Item 2) on curbside rear of trailer frame (Figure 1, Item 1).

NOTE

When performing the following steps, be observant of trailer and cable assembly. Do not cut or damage cable assembly.

7. Using two strap ties, secure stop light pig tails/ inter-vehicular cable connection to back side of trailer vehicle stop light assembly mounting bracket. Trim excess length from zip ties.

8. Install cable clamp (Figure 1, Item 3) located at rear center of trailer. Secure to stud (Figure 1, Item 2) using self locking nut (Figure 1, Item 5).

9. Draw excess inter-vehicular cable through cable clamp (Figure 1, Item 5) towards roadside rear of trailer (Figure 1, Item 1). Install cable clamp (Figure 1, Item 3) and secure to stud with self-locking nut (Figure 1, Item 5).

10. Coil up any excess inter-vehicular cable and secure with strap tie above roadside vehicle stop light assembly.

11. Install final cable clamp (Figure 1, Item 3) and secure with self locking nut (Figure 1, Item 5) to stud (Figure 1, Item 2) on roadside rear of trailer frame (Figure 1, Item 1).

END OF TASK

TEST

1. Connect inter-vehicular cable to tow vehicle and vehicle quick disconnect.

2. Have driver turn on running lights, observe that trailer running lights activate.

3. While driver pushes down on brake pedal, observe that trailer brake lights activate.

4. While driver activates turn signals and hazard lights, observe that turn signal and hazard light on trailer activate.

5. While driver activates black-out drive lights, observe that trailer blackout lights activate.

6. If any of the above steps fail troubleshoot system.

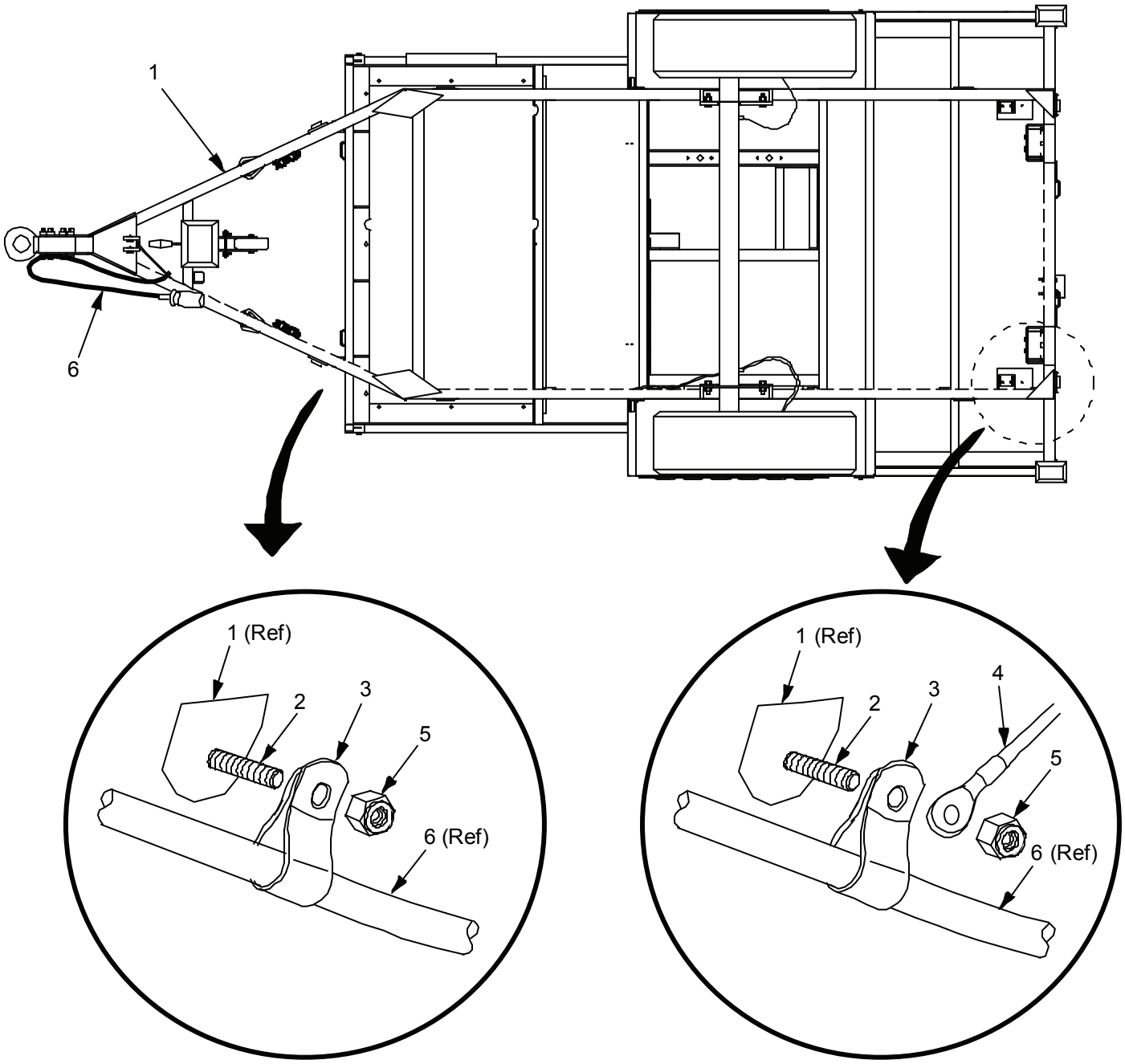
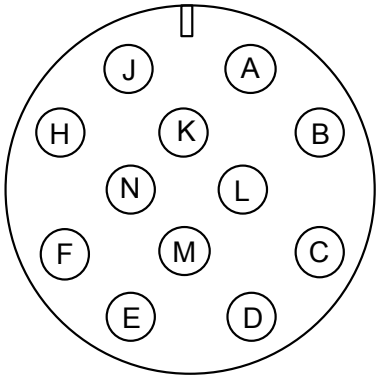


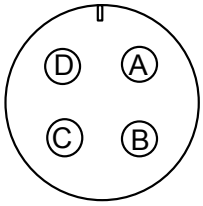
Figure 1. Inter-Vehicular Cable Removal/Replacement.

Table 1. Cable Assembly/Stop Light (LED) Connections.

FROM (Vehicle connector)	CIRCUIT NUMBER	TO Tail-light connections
A	24-484	LH Black-out
B	24-461	LH Signal
C	24-483	RH Black-out
D	90	Ground
E	21-489	Stop lights
F	23	Black-out Stop
H	490	N/C
J	22-460	RH signal
K	37	N/C
L	90	Ground
M	53	N/C
N	53	N/C



Vehicle Connection



Vehicle Stop Light (Incandescent)

Figure 2. Inter-Vehicular Cable Connectors (Incandescent).

Table 2. Cable Assembly/Stop Light (Incandescent) Connections.

FROM (Vehicle connector)	CIRCUIT NUMBER	Tail-light connections	TO LH Tail-light connectors	TO RH Tail-light connectors
A	24-484	LH Black-out	A	
B	24-461	LH Signal	B	
C	24-483	RH Black-out		A
D	90	Ground		
E	21-489	Stop lights	C	B
F	23	Black-out Stop	D	C
H	490	N/C		
J	22-460	RH signal		D
K	37	N/C		
L	90	Ground		
M	53	N/C		
N	53	N/C		

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TRAILER BRAKES (WHEEL ASSEMBLY)

GENERAL

This work package provides information on the removal and replacement of the following components:

- Brake hub/drum removal, clean and inspect, and replacement
- Wheel cylinder removal, clean and inspect, and replacement
- Brakeshoe removal, clean and inspect, and replacement
- Backing plate removal and replacement
- Brake adjustment

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

DO NOT allow grease to contact brakeshoe linings. Wipe excess lubricant from the brakeshoe linings to prevent grease soaking into the materials. Brakeshoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

DO NOT handle brakeshoes, drum/hubs, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if touched or inhaled. Wear an approved filter mask and gloves.

NEVER use compressed air or a dry brush to clean brake components. Injury may result.

Never replace only one brakeshoe. Combinations of old and new brakeshoes will cause uneven braking. Accidents causing serious injury or death to personnel or damage to equipment may result.

BRAKE HUB/DRUM REMOVAL/CLEAN AND INSPECT/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Brake hub/drum
Dry cleaning solvent (WP 0168, Item 11)
Wheel bearing grease (WP 0168, Item 25)
Cotter pin

Personnel Required
Two

Reference
WP 0129

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

DO NOT allow grease to contact brakeshoe linings. Wipe excess lubricant from the brakeshoe linings to prevent grease soaking into the materials. Brakeshoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

DO NOT handle brakeshoes, drum/hubs, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if touched or inhaled. Wear an approved filter mask and gloves.

NEVER use compressed air or a dry brush to clean brake components. Injury may result.

REMOVAL

1. Remove tire and wheel assembly as per (WP 0129) of this TM.
2. Using a pry bar and hammer remove the axle grease cap (Figure 1, Item 1).
3. Remove o-ring (Figure 1, Item 12), if applicable, and cotter pin (Figure 1, Item 3) and discard cotter pin.
4. Remove spindle nut (Figure 1, Item 2) and washer (Figure 1, Item 4).
5. Remove hub/drum (Figure 1, Item 7) with bearings and grease seal installed.
6. Remove grease seal (Figure 1, Item 10) from hub/drum (Figure 1, Item 7).
7. Remove inner bearing (Figure 1, Item 9) and outer bearing (Figure 1, Item 5) from hub/drum (Figure 1, Item 7).

REMOVAL – Continued

8. Remove outer bearing race (Figure 1, Item 6) from hub/drum (Figure 1, Item 7).

9. Remove inner bearing race (Figure 1, Item 8) from hub/drum (Figure 1, Item 7).

END OF TASK

CLEAN AND INSPECT

WARNING

Dry cleaning solvent MIL-PRF-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and DO NOT breath vapors. DO NOT use near open flame or excessive heat.

1. Clean all removed components with dry cleaning solvent and allow to dry.

2. Inspect components for wear, cracks, corrosion, or other damage. Replace if damaged.

3. Inspect race and bearing, replace both as a pair if necessary.

4. Remove any corrosion with a wire brush.

WARNING

Removing metal parts could be dangerous to personnel. Always wear eye protection when replacing wheel studs. Failure to follow this warning may result in injury to personnel.

NOTE

Perform steps 5 and 6 only if any studs are damaged.

5. Drive stud (Figure 1, Item 11) out of hub/drum (Figure 1, Item 7). Discard stud.

6. Align splines on stud (Figure 1, Item 11) with splines in hub/drum (Figure 1, Item 7) and press stud (Figure 1, Item 11) into hub/drum (Figure 1, Item 7) until stud shoulder seats against hub/drum.

END OF TASK

REPLACEMENT

1. Install outer bearing race (Figure 1, Item 6) and apply a thin film of grease to surface of outer bearing race.

2. Install inner bearing race (Figure 1, Item 8) and apply a thin film of grease to surface of inner bearing race.

3. Pack both bearings (Figure 1, Items 5 and 9) with grease by pressing fresh bearing grease into bearing roller area.

4. Install inner bearing (Figure 1, Item 9) in hub/drum (Figure 1, Item 7).

5. Apply a thin film of grease to the outer edge of grease seal (Figure 1, Item 10) and install grease seal (Figure 1, Item 10) in hub/drum (Figure 1, Item 7). Wipe excessive grease from outer surface of seal.

6. Install hub/drum (Figure 1, Item 7), with inner bearing and seal, on axle.

REPLACEMENT – Continued

7. Install outer bearing (Figure 1, Item 5), washer (Figure 1, Item 4), and spindle nut (Figure 1, Item 2).
8. Ensure spindle nut (Figure 1, Item 2) turns freely on the spindle and the brakes are not dragging.
9. While turning the hub/drum (Figure 1, Item 7) slowly, tighten the spindle nut (Figure 1, Item 2) to seat bearings.
10. Back off the spindle nut (Figure 1, Item 2) as required to align the cotter pin hole. Hub/drum must turn freely.

WARNING

Do not over tighten spindle nut or bearing damage will result.

The cotter pin (Figure 1, Item 3) prevents the spindle nut (Figure 1, Item 2) from coming loose. Failure to install the cotter pin properly will cause the spindle nut to back off of the spindle causing loss of wheel assembly.

11. Install a cotter pin (Figure 1, Item 3) and bend ends to secure the spindle nut (Figure 1, Item 2).
12. If applicable, press o-ring (Figure 1, Item 12) over spindle nut (Figure 1, Item 2).
13. Apply grease to surface of grease cap (Figure 1, Item 1).
14. Install grease cap (Figure 1, Item 1) on hub/drum (Figure 1, Item 7).
15. Install tire and wheel assembly as per (WP 0129) of this TM.

REPLACEMENT – Continued

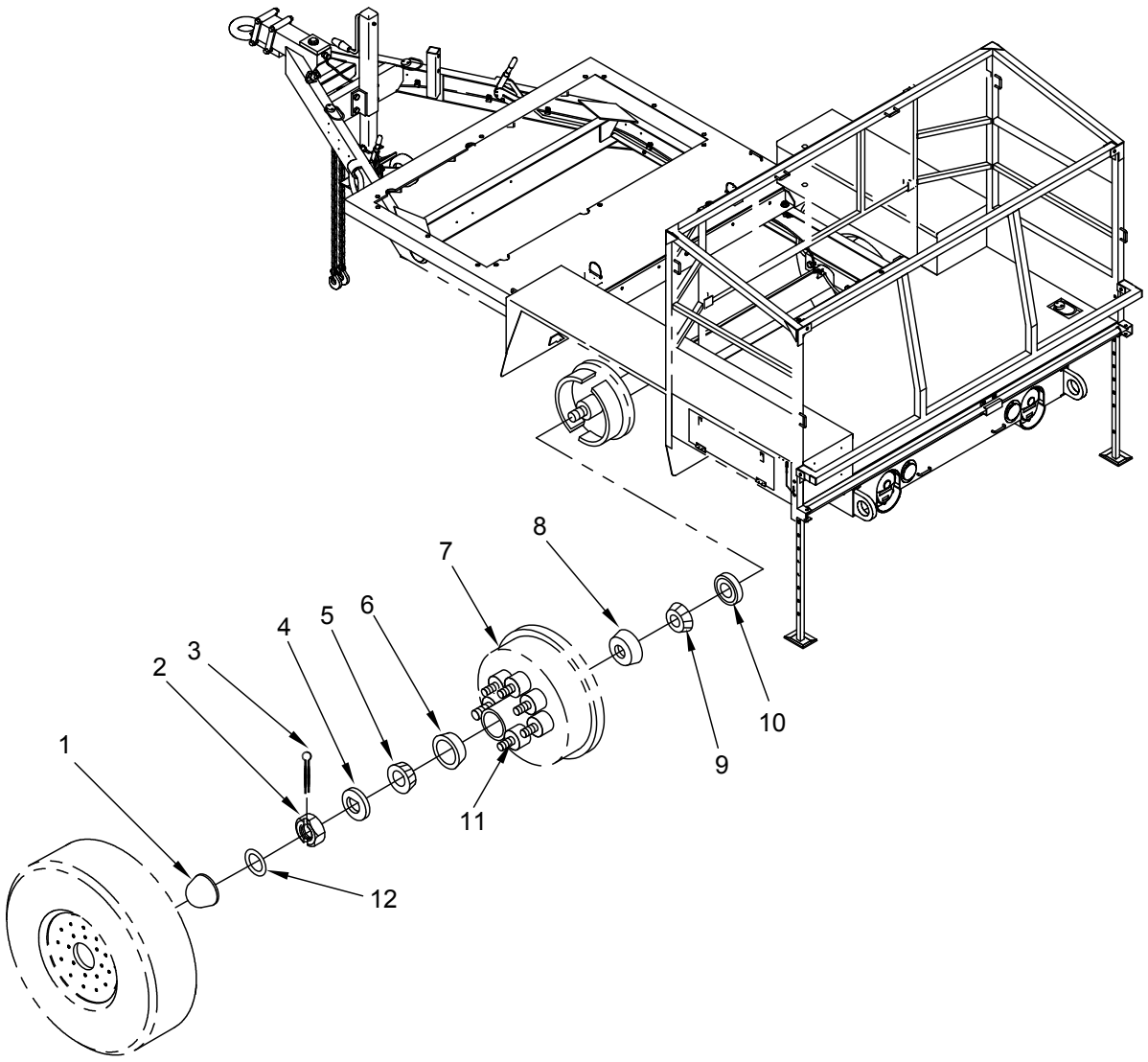


Figure 1. Brake Hub/Drum Removal/Replacement.

END OF TASK

WHEEL CYLINDER REMOVAL/CLEAN AND INSPECT/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Wheel cylinder
Dry cleaning solvent (WP 0168, Item 11)
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
Two

Reference
WP 0129, WP 0127

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

DO NOT allow grease to contact brakeshoe linings. Wipe excess lubricant from the brakeshoe linings to prevent grease soaking into the materials. Brakeshoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

DO NOT handle brakeshoes, drum/hubs, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if touched or inhaled. Wear an approved filter mask and gloves.

NEVER use compressed air or a dry brush to clean brake components. Injury may result.

REMOVAL

1. Remove tire and wheel assembly as per (WP 0129) of this TM.
2. Remove hub/drum assembly as per this WP.
3. Remove front shoe spring (Figure 2, Item 15) from front brakeshoe (Figure 2, Item 13) and backing plate anchor pin (Figure 2, Item 5).
4. Remove rear shoe spring (Figure 2, Item 16) from rear brakeshoe (Figure 2, Item 24) and backing plate anchor pin (Figure 2, Item 5).
5. Remove two capscrews (Figure 2, Item 1) with integral lock washers securing wheel cylinder (Figure 2, Item 6) to backing plate (Figure 2, Item 4).
6. Pull wheel cylinder (Figure 2, Item 6) loose from backing plate (Figure 2, Item 4) while compressing push rod (Figure 2, Item 7); remove push rod (Figure 2, Item 7) from brakeshoe (Figure 2, Item 13).

REMOVAL – Continued

7. Disconnect flexible brake line (Figure 2, Item 3) from cross over brake line, retain clip (WP 0127, Figure 2, Item 11).

8. Install two temporary plugs in flexible brake line (Figure 2, Item 3) and cross over brake line.

9. Remove flexible brake line (Figure 2, Item 3) from wheel cylinder (Figure 2, Item 6). Set flexible brake line (Figure 2, Item 3) aside. Discard wheel cylinder.

END OF TASK

CLEAN AND INSPECT

WARNING

Dry cleaning solvent MIL-PRF-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and DO NOT breath vapors. DO NOT use near open flame or excessive heat.

1. Clean all removed components except wheel cylinder (Figure 2, Item 6) with dry cleaning solvent and allow to dry.

2. Inspect components for cracks, breaks, corrosion, or damaged threads. Replace if damaged.

END OF TASK

REPLACEMENT

1. Attach flexible brake line (Figure 2, Item 3) to wheel cylinder (Figure 2, Item 6) and tighten.

2. Remove two temporary plugs from flexible brake line (Figure 2, Item 3) and cross over brake line.

3. Connect flexible brake line (Figure 2, Item 3) to cross over brake line and install clip (WP 0127, Figure 2, Item 11).

4. Install push rod (Figure 2, Item 7) in brakeshoe (Figure 2, Item 13) and wheel cylinder (Figure 2, Item 6) and mount onto backing plate (Figure 2, Item 4). Retighten all lines.

NOTE

For ease of installation, install the rear capscrew first.

5. Install two capscrews (Figure 2, Item 1) with integral lock washers and tighten finger tight. Torque capscrews (Figure 2, Item 1) to 168 ± 17 in-lb (19 ± 1.9 N·m).

6. Install rear shoe spring (Figure 2, Item 16) to rear brakeshoe (Figure 2, Item 24) and backing plate anchor pin (Figure 2, Item 5).

7. Install front shoe spring (Figure 2, Item 15) to front brakeshoe (Figure 2, Item 13) and backing plate anchor pin (Figure 2, Item 5).

8. Install hub/drum assembly as per this WP.

9. Bleed brakes as per (WP 0127) of this TM.

10. Install tire and wheel assembly as per (WP 0129) of this TM.

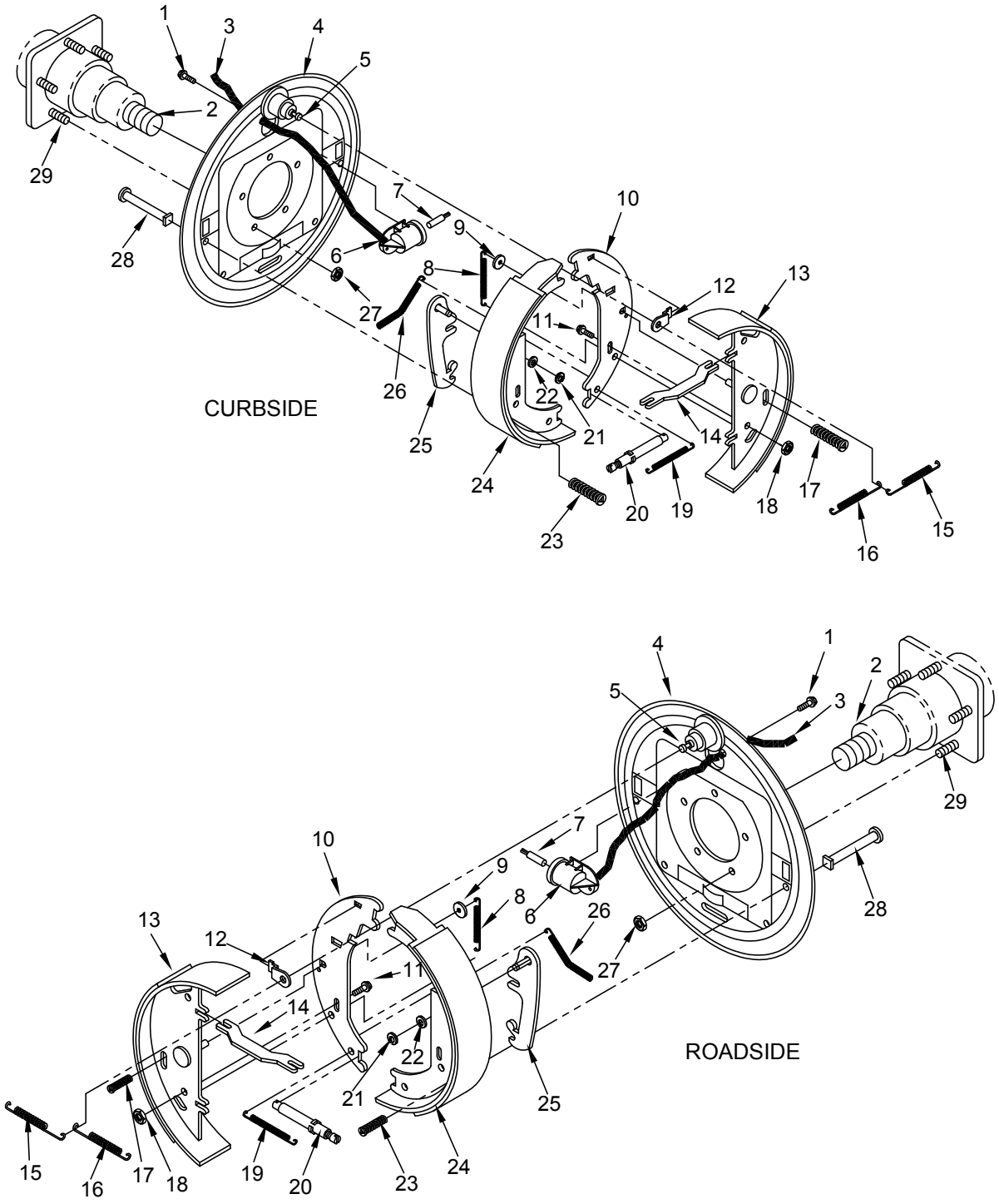


Figure 2. Wheel Cylinder, Brakeshoe, and Backing Plate Removal/Clean and Inspect/Replacement.

END OF TASK

BRAKESHOE REMOVAL/CLEAN AND INSPECT/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Brakeshoes
Dry cleaning solvent (WP 0168, Item 11)
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
Two

Reference
WP 0129, WP 0128

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

DO NOT allow grease to contact brakeshoe linings. Wipe excess lubricant from the brakeshoe linings to prevent grease soaking into the materials. Brakeshoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

DO NOT handle brakeshoes, drum/hubs, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if touched or inhaled. Wear an approved filter mask and gloves.

NEVER use compressed air or a dry brush to clean brake components. Injury may result.

Never replace only one brakeshoe. Combinations of old and new brakeshoes will cause uneven braking. Accidents causing serious injury or death to personnel or damage to equipment may result.

REMOVAL

1. Remove tire and wheel assembly as per (WP 0129) of this TM.
2. Remove hub/drum assembly as per this WP.
3. Remove front shoe spring (Figure 2, Item 15) from front brakeshoe (Figure 2, Item 13) and backing plate anchor pin (Figure 2, Item 5).
4. Remove rear shoe spring (Figure 2, Item 16) from rear brakeshoe (Figure 2, Item 24) and backing plate anchor pin (Figure 2, Item 5).
5. Remove front brakeshoe hold down cup and spring (Figure 2, Item 17) from front brakeshoe hold down pin securing front brakeshoe (Figure 2, Item 13) to backing plate (Figure 2, Item 4).

REMOVAL – Continued

6. Remove parking shoe lever (Figure 2, Item 14) and set parking shoe lever aside.

7. Remove travel link (Figure 2, Item 12) from anchor pin (Figure 2, Item 5) and front brakeshoe (Figure 2, Item 13).

8. Rotate and lower front brakeshoe (Figure 2, Item 13). Remove adjuster (Figure 2, Item 20) and adjuster spring (Figure 2, Item 19) from front brakeshoe. Remove adjuster spring from rear brakeshoe and set aside.

9. Remove rear brakeshoe hold down cup and spring (Figure 2, Item 23) from rear brakeshoe hold down pin (Figure 2, Item 28) securing rear brakeshoe (Figure 2, Item 24) to backing plate (Figure 2, Item 4).

10. While holding rear brakeshoe, remove parking brake cable (Figure 2, Item 26) from parking brake link (Figure 2, Item 25). If necessary, see (WP 0128, Figure 7, Items 3 and 5) of this TM.

11. Set rear brakeshoe and parking brake link aside.

12. Using a flat tip screw driver, pry retainer (Figure 2, Item 21) from parking brake link (Figure 2, Item 25) on rear brakeshoe assembly (Figure 2, Item 24). Remove washer (Figure 2, Item 22) and set parking brake link, retainer, and washer aside.

13. Slide parking brake link (Figure 2, Item 25) out of rear brakeshoe (Figure 2, Item 24) and set parking brake link aside. Discard rear brakeshoe.

14. Release top of tension spring (Figure 2, Item 8) on rear of front brakeshoe (Figure 2, Item 13).

15. Remove washer (Figure 2, Item 9) from rear of front brakeshoe (Figure 2, Item 13).

16. Remove bolt (Figure 2, Item 11) and lock nut (Figure 2, Item 18) holding front brakeshoe (Figure 2, Item 13) and backing shoe lever (Figure 2, Item 10) together.

17. Slide backing shoe lever (Figure 2, Item 10) off of front brakeshoe (Figure 2, Item 13).

18. Remove tension spring (Figure 2, Item 8) from back of backing shoe lever (Figure 2, Item 10). Set backing shoe lever and tension spring aside. Discard front brakeshoe.

END OF TASK

CLEAN AND INSPECT

WARNING

Dry cleaning solvent MIL-PRF-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and DO NOT breath vapors. DO NOT use near open flame or excessive heat.

1. Clean all parts with dry cleaning solvent and rag.

2. Inspect all parts for damage. Replace any damaged parts.

3. Inspect brakeshoe surface for cracks, distortion, and excessive wear. Brakeshoe linings should have a minimum thickness of 1/8 inch (3.2 mm). Replace brakeshoe if cracked or if lining thickness is less that 1/8 inch (3.2 mm).

END OF TASK

REPLACEMENT

1. Slide backing shoe lever (Figure 2, Item 10) onto front brakeshoe (Figure 2, Item 13).
2. Insert bolt (Figure 2, Item 11) and lock nut (Figure 2, Item 18) through front brakeshoe (Figure 2, Item 13) and backing shoe lever (Figure 2, Item 10) and tighten.
3. Attach washer (Figure 2, Item 9) to stud on rear of front brakeshoe (Figure 2, Item 13).
4. Attach tension spring (Figure 2, Item 8) to rear of front brakeshoe (Figure 2, Item 13) and set assembly aside.
5. Slide parking brake link (Figure 2, Item 25) into rear brakeshoe (Figure 2, Item 24).
6. Attach washer (Figure 2, Item 22) to parking brake link stud (Figure 2, Item 25) of rear brakeshoe (Figure 2, Item 24) and slide retainer (Figure 2, Item 21) onto parking brake link stud (Figure 2, Item 25).
7. Squeeze retainer (Figure 2, Item 21) with pliers to lock into place and set rear brakeshoe assembly aside.
8. Install travel link (Figure 2, Item 12) on front brakeshoe (Figure 2, Item 13).
9. Hold front brakeshoe assembly (Figure 2, Item 13) in position and slide travel link (Figure 2, Item 12) onto backing plate anchor pin (Figure 2, Item 5).
10. Rotate front brakeshoe assembly down and insert wheel cylinder push rod (Figure 2, Item 7) into backing shoe lever (Figure 2, Item 10).
11. Install front brakeshoe hold down cup and spring (Figure 2, Item 17) into front brakeshoe hold down pin to secure front brakeshoe (Figure 2, Item 13) to backing plate (Figure 2, Item 4). Install front shoe spring (Figure 2, Item 15) to backing plate anchor pin (Figure 2, Item 5).
12. Install parking shoe lever (Figure 2, Item 14) into front brakeshoe (Figure 2, Item 13).
13. Insert adjuster spring (Figure 2, Item 19) into front brakeshoe (Figure 2, Item 13).
14. While holding rear brakeshoe assembly (Figure 2, Item 24), attach parking brake cable (Figure 2, Item 26) to parking brake link (Figure 2, Item 25). If necessary, see (WP 0128, Figure 7, Items 3 and 5) of this TM.
15. Insert adjuster (Figure 2, Item 20) into front brakeshoe (Figure 2, Item 13).
16. Hold rear brakeshoe assembly (Figure 2, Item 24) in position and insert adjuster spring (Figure 2, Item 19) into rear brakeshoe hole (Figure 2, Item 24).
17. Rotate rear brakeshoe assembly (Figure 2, Item 24) around adjuster (Figure 2, Item 20) until adjuster (Figure 2, Item 20) fits into slot of rear brakeshoe assembly (Figure 2, Item 24).
18. Install parking shoe lever (Figure 2, Item 14) into rear brakeshoe (Figure 2, Item 24).
19. Install rear brakeshoe hold down cup and spring (Figure 2, Item 23) onto rear brakeshoe hold down pin (Figure 2, Item 28) to secure rear brakeshoe (Figure 2, Item 24) to backing plate (Figure 2, Item 4).
20. Install rear brakeshoe spring (Figure 2, Item 16) from rear brakeshoe (Figure 2, Item 24) into backing plate anchor pin (Figure 2, Item 5).
21. Install hub/drum assembly as per this WP.

REPLACEMENT – Continued

22. Install tire and wheel assembly as per (WP 0129) of this TM.

23. Perform brake adjustment as per this WP.

END OF TASK

BACKING PLATE REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Backing plate
Dry cleaning solvent (WP 0168, Item 11)
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
Two

Reference
WP 0128, WP 0129

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

DO NOT allow grease to contact brakeshoe linings. Wipe excess lubricant from the brakeshoe linings to prevent grease soaking into the materials. Brakeshoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

DO NOT handle brakeshoes, drum/hubs, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if touched or inhaled. Wear an approved filter mask and gloves.

NEVER use compressed air or a dry brush to clean brake components. Injury may result.

REMOVAL

1. Remove tire and wheel assembly as per (WP 0129) of this TM.
2. Remove hub/drum assembly as per this WP.
3. Remove brakeshoes as per this WP.
4. Remove wheel cylinder as per this WP.
5. Remove parking brake cable from backing plate (Figure 2, Item 4). If necessary, see (WP 0128, Figure 7, Items 3 and 5) of this TM.
6. Remove 5 nuts (Figure 2, Item 27) from mounting studs (Figure 2, Item 29) securing backing plate (Figure 2, Item 4) to axle spindle (Figure 2, Item 2). Remove backing plate (Figure 2, Item 4).

END OF TASK

REPLACEMENT

WARNING

DO NOT allow grease to contact brakeshoe linings. Wipe excess lubricant from the brakeshoe linings to prevent grease soaking into the materials. Brakeshoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

1. Install backing plate (Figure 2, Item 4) on axle spindle (Figure 2, Item 2). Install 5 nuts (Figure 2, Item 27) onto mounting studs (Figure 2, Item 29). Tighten nuts and torque to 50 ± 5 ft-lb (69 ± 7 N·m).

2. Install parking brake cable to backing plate (Figure 2, Item 4). If necessary, see (WP 0128, Figure 7, Items 3 and 5) of this TM.

3. Install wheel cylinder as per this WP.

4. Install brakeshoes as per this WP.

5. Install hub/drum assembly as per this WP.

6. Install tire and wheel assembly as per (WP 0129) of this TM.

7. Perform brake adjustment as per this WP.

END OF TASK

BRAKE ADJUSTMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Personnel Required
Two

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels choked
ECU shut down
Genset shut down

ADJUSTMENT

NOTE

Service brake adjustment should be performed on all wheels to compensate for normal brakeshoe lining wear.

1. Remove wheel choke on side being adjusted. Ensure opposite wheel is choked.
2. Place 3 ton hydraulic jack under trailer frame near wheel assembly to be adjusted.

NOTE

Prior to raising trailer make sure that stabilizer leg on opposite side of trailer is not down.

3. Using three-ton jack, raise trailer to sufficient height where fully inflated wheel assembly (Figure 3, Item 2) may be rotated freely.
4. Place three-ton jack stand (Figure 3, Item 1) under trailer axle between wheel assembly and axle mount. Raise jack stand (Figure 3, Item 1) to meet trailer axle. Lower trailer onto jack stand.

WARNING

When the following step is being performed, the trailer is in a very unstable position. This procedure should be performed in a timely manner and the trailer should not be left unattended. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

5. Release hand brake on side being adjusted.
6. Remove protective plug (Figure 3, Item 4) from backing plate.
7. Rotate star wheel (Figure 3, Item 3) upward, 20 to 25 clicks, to tighten brakes.

ADJUSTMENT – Continued

NOTE

The brake adjustment is performed by rotating the wheel using a torque wrench (Figure 3, Item 5) and measuring the force required to turn the wheel. While checking the adjustment, the wheel must be turned in the forward direction to ensure correct adjustment. Rotate wheel in the forward direction from taillight toward the tongue.

The torque wrench must be properly aligned on the wheel to ensure accurate measurement of force. Proper placement for the torque wrench is with the handle pointing away from the center of the wheel and in a straight line with the center of the grease cap.

If the wheel rotates in the reverse or backwards direction, the brake shoes must be aligned by starting the procedure again.

8. Rotate the wheel three or four revolutions in the forward direction and stop the wheel where two opposing lug nuts are directly above and below the center of the grease cap.

9. Set torque wrench to 170 ± 17 in-lb (19 ± 1.9 N·m) and place on the top lug nut and turn the wheel 90 degrees, 1/4 rotation, in the forward direction checking whether the torque wrench exceeded the setting.

10. Move the torque wrench back to the top, checking every other lug nut and repeating step 9. Continue until four lug nuts have been checked, one full rotation of the wheel.

11. Reset the torque wrench to 220 ± 22 in-lb (24 ± 2.4 N·m) and repeat steps 9 and 10. If the torque measurements at two or more lugs are less than 170 in-lbs, tighten the brakes and repeat steps 9 through 11. If the torque measurement at two or more lugs is greater than 220 in-lbs, loosen the brakes and repeat steps 9 through 11.

12. Loosen brakes by rotating star wheel in the opposite direction 25 clicks.

13. Install protective plug (Figure 3, Item 4) in backing plate.

14. Using three-ton jack, raise trailer to sufficient height to remove jack stand (Figure 3, Item 1).

15. Remove three-ton jack.

16. Repeat steps 5 through 15 for other side.

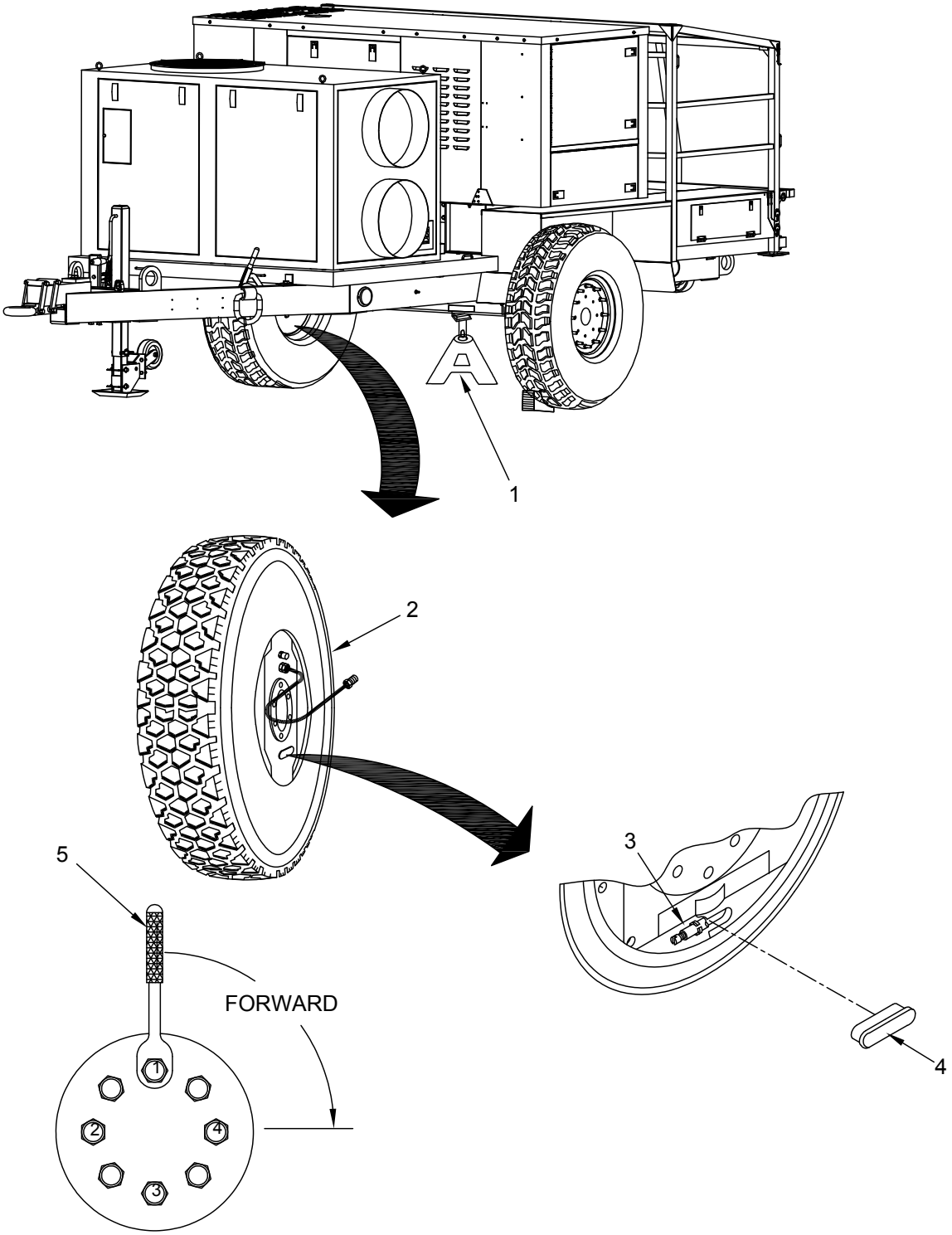


Figure 3. Brake Adjustment.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TRAILER BRAKES

GENERAL

This work package provides information on the removal and replacement of the following components:

- Master cylinder removal and replacement
- Brake lines removal and replacement
- Bleed brake system

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

MASTER CYLINDER REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Master cylinder
Drain pans

Personnel Required
Two

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

NOTE

When disconnecting brake line, brake fluid will drain out. Use drain pan to catch old brake fluid and discard properly.

REMOVAL

1. Remove the main hydraulic brake line (Figure 1, Item 6) from master cylinder (Figure 1, Item 4).
2. Remove 2 mounting bolts (Figure 1, Item 8) and lock nuts (Figure 1, Item 3) from trailer frame (Figure 1, Item 2) and master cylinder (Figure 1, Item 4).
3. Retain 4 spacers (Figure 1, Item 5) from between master cylinder (Figure 1, Item 4) and trailer frame (Figure 1, Item 2).
4. Slide master cylinder (Figure 1, Item 4) back toward trailer bed, being careful not to damage actuator shaft (Figure 1, Item 1).

END OF TASK

REPLACEMENT

1. Lift actuator shaft (Figure 1, Item 1) while sliding master cylinder (Figure 1, Item 4) into trailer frame (Figure 1, Item 2).
2. Slide actuator shaft (Figure 1, Item 1) into slot in master cylinder plunger (Figure 1, Item 7).
3. Position spacers (Figure 1, Item 5) in between master cylinder (Figure 1, Item 4) and trailer frame (Figure 1, Item 2).
4. Insert mounting bolts (Figure 1, Item 8) and lock nuts (Figure 1, Item 3) into trailer frame (Figure 1, Item 2), master cylinder (Figure 1, Item 4), and spacers (Figure 1, Item 5) and tighten.
5. Attach main hydraulic brake line (Figure 1, Item 6) to master cylinder (Figure 1, Item 4) and tighten.
6. Bleed brakes as per this WP.

REPLACEMENT – Continued

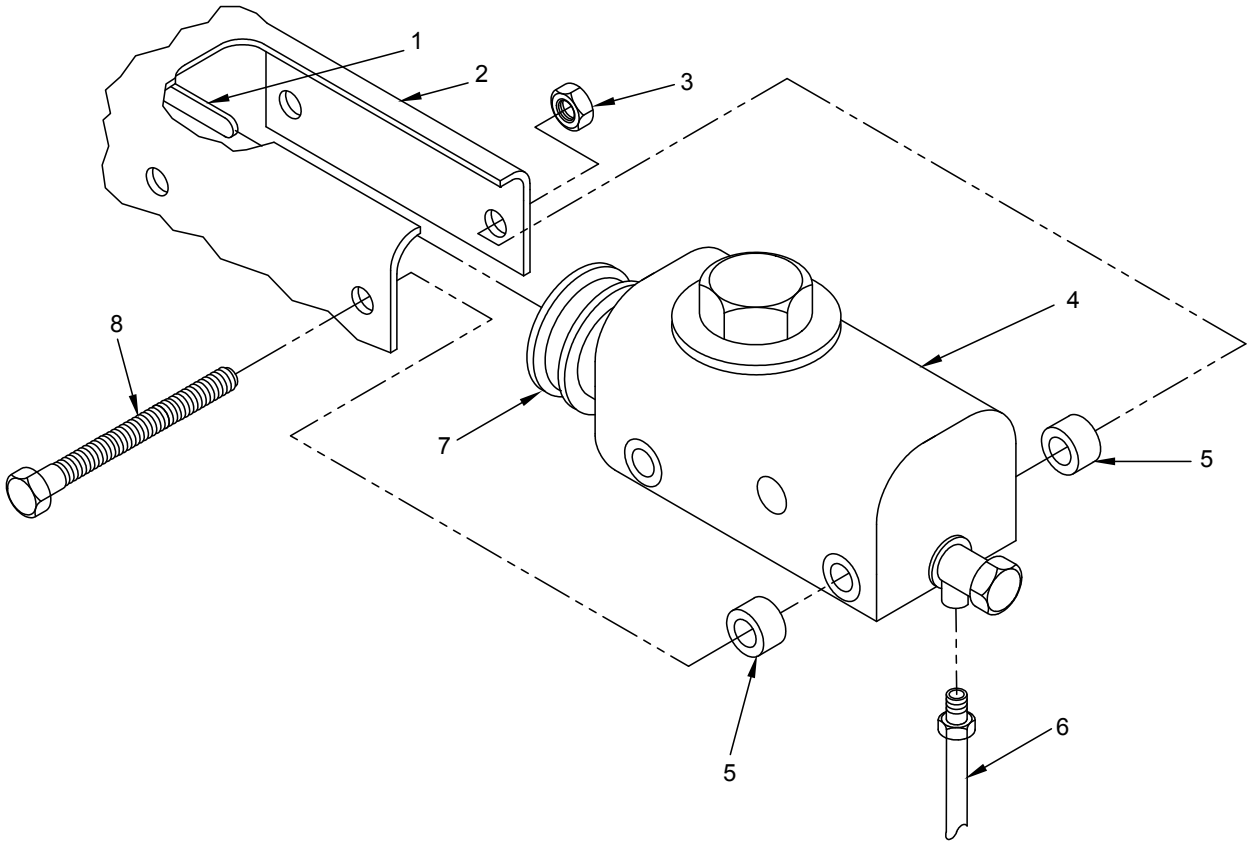


Figure 1. Master Cylinder Removal/Replacement.

END OF TASK

BRAKE LINE REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Brake line
Drain pans
Strap ties (WP 0168, Items 55 to 57)

Personnel Required
Two

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

REMOVAL (MAIN HYDRAULIC LINE)

1. Ensure hand brakes are locked.
2. Ensure brake lockout is not engaged.

NOTE

When disconnecting brake line, brake fluid will drain out. Use drain pan to catch old brake fluid and discard properly.

3. Place drain pans under the hydraulic brake line distribution block (Figure 2, Item 9) and the master cylinder (Figure 2, Item 13).
4. Remove five lock nuts (Figure 2, Item 1) from the main hydraulic brake line mounting studs (Figure 2, Item 3).
5. Remove five mounting clamps (Figure 2, Item 2) from mounting studs (Figure 2, Item 3).
6. Disconnect the main brake line (Figure 2, Item 12) from the hydraulic brake line distribution block (Figure 2, Item 9).
7. Drain brake fluid into drain pan.
8. Disconnect the main hydraulic brake line (Figure 2, Item 12) on master cylinder (Figure 2, Item 13).
9. Remove and retain mounting clamps (Figure 2, Item 2) from brake line and discard brake line.

END OF TASK

REPLACEMENT (MAIN HYDROLIC LINE)

1. Place the main hydraulic brake line (Figure 2, Item 12) into position through the trailer frame.
2. Place the five mounting clamps (Figure 2, Item 2) onto the main hydraulic brake line (Figure 2, Item 12) in the vicinity of the five mounting studs (Figure 2, Item 3) and place the opening of the clamps onto the studs.
3. Attach the main hydraulic brake line (Figure 2, Item 12) onto the master cylinder (Figure 2, Item 13) and tighten down.
4. Connect the main hydraulic brake line connector (Figure 2, Item 5) to the distribution block (Figure 2, Item 9) and tighten down.
5. Install the five lock nuts (Figure 2, Item 1) onto the main hydraulic brake line mounting studs (Figure 2, Item 3) and tighten down.
6. Bleed brakes as per this WP.

END OF TASK

REMOVAL (CROSS-OVER HYDRAULIC LINE)

1. Ensure hand brakes are locked.
2. Ensure brake lockout is not engaged.

NOTE

When disconnecting brake line, brake fluid will drain out. Use drain pan to catch old brake fluid and discard properly.

3. Place a drain pan under each end of cross over hydraulic brake line.
4. Cut any zip ties securing the cross over brake line to the axle.
5. Disconnect cross over hydraulic brake line (Figure 2, Item 8) from the flexible brake line (Figure 2, Item 10). Remove and retain clip (Figure 2, Item 11).
6. Disconnect cross over hydraulic brake line (Figure 2 Item 8) from hydraulic brake line distribution block (Figure 2, Item 9).
7. Remove and discard brake line.

END OF TASK

REPLACEMENT (CROSS-OVER HYDRAULIC LINE)

1. Place the cross over brake line (Figure 2, Item 8) into position.
2. Finger tighten the cross over brake line (Figure 2, Item 8) onto the hydraulic brake line distribution block (Figure 2, Item 9) on curb side of trailer.
3. Finger tighten cross over brake line (Figure 2, Item 8) onto the flexible brake line (Figure 2, Item 10) on street side of trailer and secure with clip (Figure 2, Item 11).
4. Tighten down both connections.

REPLACEMENT (CROSS-OVER HYDRAULIC LINE) - Continued

5. Place a zip tie around the cross over hydraulic brake line and axle. Tighten down.
6. Trim the end of the zip tie off.
7. Bleed brakes as per this WP.

END OF TASK

REMOVAL (FLEXIBLE LINE)

1. Ensure hand brakes are locked.
2. Ensure brake lockout is not engaged.

NOTE

When disconnecting brake line, brake fluid will drain out. Use collection container to catch old brake fluid and discard properly.

3. Place drain pans under both ends of the flexible brake lines (Figure 2, Item 3).
4. Disconnect the flexible brake line (Figure 2, Item 7) from the wheel cylinder (Figure 2, Item 6).
5. Disconnect the flexible brake line (Figure 2, Item 7) from the distribution block (Figure 2, Item 9). Remove and retain clip (Figure 2, Item 11).
6. Disconnect the flexible brake line (Figure 2, Item 10) from the wheel cylinder.
7. Disconnect the flexible brake line (Figure 2, Item 10) from the cross over hydraulic brake line (Figure 2, Item 8). Remove and retain clip (Figure 2, Item 11).
8. Discard brake lines.

END OF TASK

REPLACEMENT (FLEXIBLE LINE)

1. 1.Place the flexible line (Figure 2, Item 10) into position.
2. Finger tighten the flexible brake line (Figure 2, Item 10) onto the cross over brake line (Figure 2, Item 8). Retain with clip (Figure 2, Item 11).
3. Finger tighten the flexible brake line (Figure 2, Item 10) onto the wheel cylinder.
4. Tighten down connections.
5. Finger tighten the flexible brake line (Figure 2, Item 7) onto the distribution block (Figure 2, Item 9). Retain with clip (Figure 2, Item 11).
6. Finger tighten the flexible brake line (Figure 2, Item 7) onto the wheel cylinder (Figure 2, Item 6).
7. Tighten down connections.
8. Bleed brakes as per this WP.

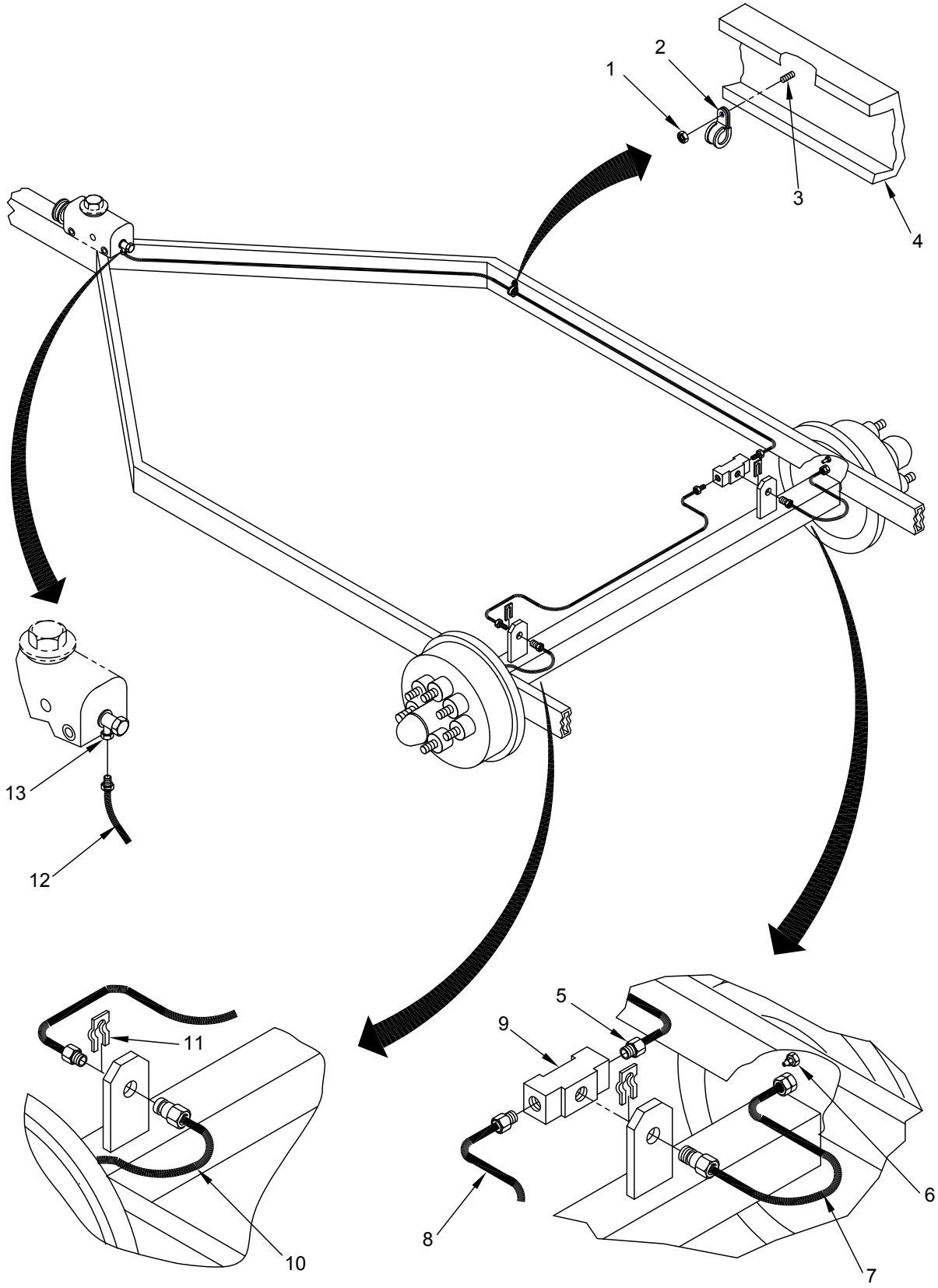


Figure 2. Brake Line Removal/Replacement.

END OF TASK

BLEED BRAKE SYSTEM

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)
Standard automotive tool set (WP 0165, Item 5)

Materials/Parts
Tow vehicle

Personnel Required
Two

Reference
WP 0022

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

Personnel must maintain a safe distance from the rear of trailer during this procedure.

NOTE

The preferred method to bleed brakes is to use a Filler and Bleeder Kit as per the individual kit's instruction manual. If a Filler and Bleeder Kit is not available, perform the Bleed Brake System procedure in this WP as an alternate procedure.

BLEED BRAKE SYSTEM

1. Back trailer against a wall or other solid object to restrict personnel from rear of trailer.

CAUTION

Do not damage trailer cargo cross-member or tail light assemblies.

2. Ensure hand brakes are locked.
3. Ensure brake lockout is not engaged.
4. Fill master cylinder brake fluid reservoir as per (WP 0022) if necessary.
5. Attach tow vehicle to trailer and secure tongue jack assembly.

WARNING

Trailer may move during process. DO NOT lie under trailer while moving vehicle. Severe injury may result to personnel.

6. Using tow vehicle, push back against trailer to compress master cylinder.
7. Remove the rubber dust cover (Figure 3, Item 2) from the cylinder bleed valve (Figure 3, Item 1) on the curb side brake cylinder and set aside.

BLEED BRAKE SYSTEM – Continued

8. Connect plastic tube (Figure 3, Item 3) to the end of cylinder bleed valve (Figure 3, Item1) and route tube into drain pan (Figure 3, Item 4).
9. Turn the curb side cylinder bleed valve (Figure 3, Item 1) 1/4 turn counter clockwise to loosen until air or fluid escapes valve.
10. When air/ fluid flow decreases, turn the cylinder bleed valve (Figure 3, Item 1) 1/4 turn clockwise to tighten.
11. Check master cylinder reservoir level and fill as per (WP 0022) if necessary.
12. Using tow vehicle, pull and push back against trailer 3 times, ending with vehicle pulling against trailer.
13. Repeat steps 6 through 10, until no air escapes cylinder bleed valve (Figure 3, Item 1).
14. Remove tube (Figure 3, Item 3) and replace rubber dust cover (Figure 3, Item 2) on to cylinder bleed valve (Figure 3, Item 1).
15. Repeat for street side brake cylinder.
16. Check master cylinder reservoir level and fill as per (WP 0022) if necessary.
17. Release trailer hand brakes.
18. Tow vehicle and stop, check that trailer tires brake.
19. Park trailer and disconnect tow vehicle.

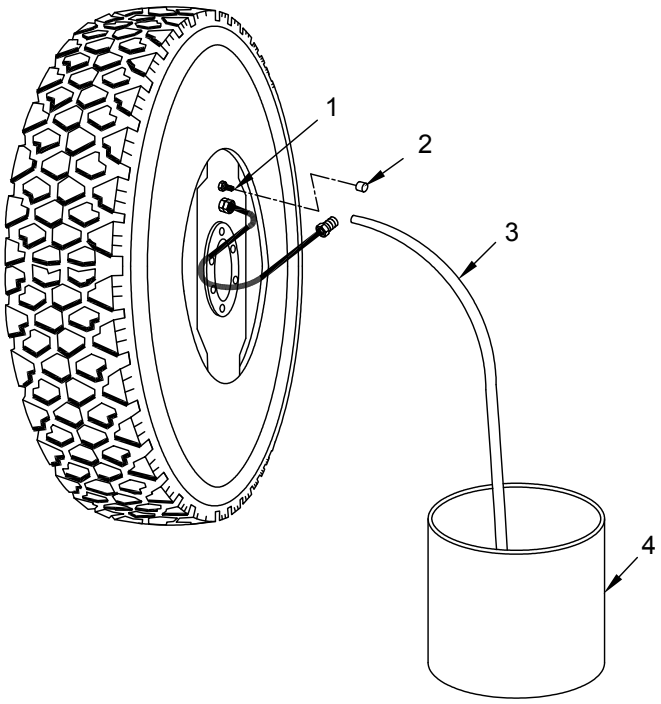


Figure 3. Bleed Brake System.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TRAILER BRAKES (BRAKE ACTUATOR AND HAND BRAKES)

GENERAL

This work package provides information on the removal and replacement of the following components:

- Brake actuator components removal and replacement
- Brake actuator assembly removal and replacement
- Hand brake assembly removal, inspect, and replacement
- Hand brake cable and sheath removal and replacement

NOTE

The following brake actuator removal/replacement procedures are for the current production model (fixed lunette). Due to safety issues, any brake actuator with an adjustable lunette needs to be replaced with a brake actuator that has a fixed lunette.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Lunette is heavy. Use caution when removing and replacing.

BRAKE ACTUATOR COMPONENTS REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0162, Item 1)
Standard Automotive Tool Set (WP 0162, Item 5)

Materials/Parts
Actuator components

Personnel Required
Two

Reference
WP 0127

Equipment Condition
Trailer parked in operational position
Handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

REMOVAL

1. Remove master cylinder as per (WP 0127).
2. Remove bolt (Figure 3, Item 1) and lock nut (Figure 3, Item 3) from shock absorber (Figure 3, Item 4).
3. Remove four lock nuts (Figure 1, Item 1) from sides of actuator mounting studs (Figure 1, Item 4).
4. Remove two actuator mounting brackets (Figure 1, Item 2) and four spacers (Figure 1, Item 3) from same side of actuator assembly and set aside.
5. Tap actuator mounting studs (Figure 1, Item 4), brackets (Figure 1, Item 2), spacers (Figure 1, Item 3), and lock nuts (Figure 1, Item 1) through to other side. Set parts aside.
6. Lower tow pintle (Figure 2, Item 4) and actuator (Figure 2, Item 3) down from actuator assembly (Figure 2, Item 2). Remove actuator (Figure 2, Item 3).
7. If replacing breakaway lever, remove bolt (Figure 2, Item 5) and lock nut (Figure 2, Item 6) from actuator assembly (Figure 2, Item 2) and lift breakaway lever (Figure 2, Item 1) from actuator assembly (Figure 2, Item 2).
8. If replacing shock absorber (Figure 3, Item 4), remove bolt (Figure 3, Item 5) and lock nut (Figure 3, Item 12) from actuator (Figure 3, Item 10).

WARNING

Use caution when removing hydraulic push rod assembly due to spring tension.

9. If replacing hydraulic push rod (Figure 3, Item 6), washer (Figure 3, Item 8), and spring (Figure 3, Item 7), place actuator (Figure 3, Item 10) on a suitable work surface and remove bolt (Figure 3, Item 9) and self-locking nut (Figure 3, Item 11) from hydraulic push rod assembly (Figure 3, Item 13).

END OF TASK

REPLACEMENT

WARNING

Use caution when installing hydraulic push rod assembly due to spring tension.

1. If replacing hydraulic push rod (Figure 3, Item 6), washer (Figure 3, Item 8), and spring (Figure 3, Item 7), place actuator (Figure 3, Item 10) on a suitable work surface and insert bolt (Figure 3, Item 9) through actuator (Figure 3, Item 10) and hydraulic push rod assembly (Figure 3, Item 13). Secure with self-locking nut (Figure 3, Item 11) and tighten.

2. If replacing shock absorber (Figure 3, Item 4), insert bolt (Figure 3, Item 5) through shock absorber (Figure 3, Item 4) and actuator (Figure 3, Item 10) and secure with lock nut (Figure 3, Item 12).

3. If replacing breakaway lever, slide breakaway lever (Figure 3, Item 1) into slot in actuator assembly (Figure 2, Item 2) and insert bolt (Figure 2, Item 5) through actuator assembly (Figure 2, Item 2) and breakaway lever (Figure 2, Item 1) and secure with lock nut (Figure 2, Item 6).

4. Raise tow pintle (Figure 2, Item 4) and actuator (Figure 2, Item 3) into actuator assembly (Figure 2, Item 2).

5. Ensure that breakaway lever (Figure 2, Item 1) slides into slot in actuator groove (Figure 2, Item 3).

6. Insert actuator mounting studs (Figure 1, Item 4), mounting brackets (Figure 1, Item 2), spacers (Figure 1, Item 3), and lock nuts (Figure 1, Item 1) into one side of actuator assembly (Figure 1, Item 5).

7. Install actuator mounting brackets (Figure 1, Item 2), spacers (Figure 1, Item 3), and lock nuts (Figure 1, Item 1) on other side of actuator assembly (Figure 3, Item 5).

8. Install bolt (Figure 3, Item 1) through shock absorber (Figure 3, Item 4) and actuator (Figure 3, Item 2). Secure with lock nut (Figure 3, Item 3). Tighten all hardware.

9. Install master cylinder as per (WP 0127).

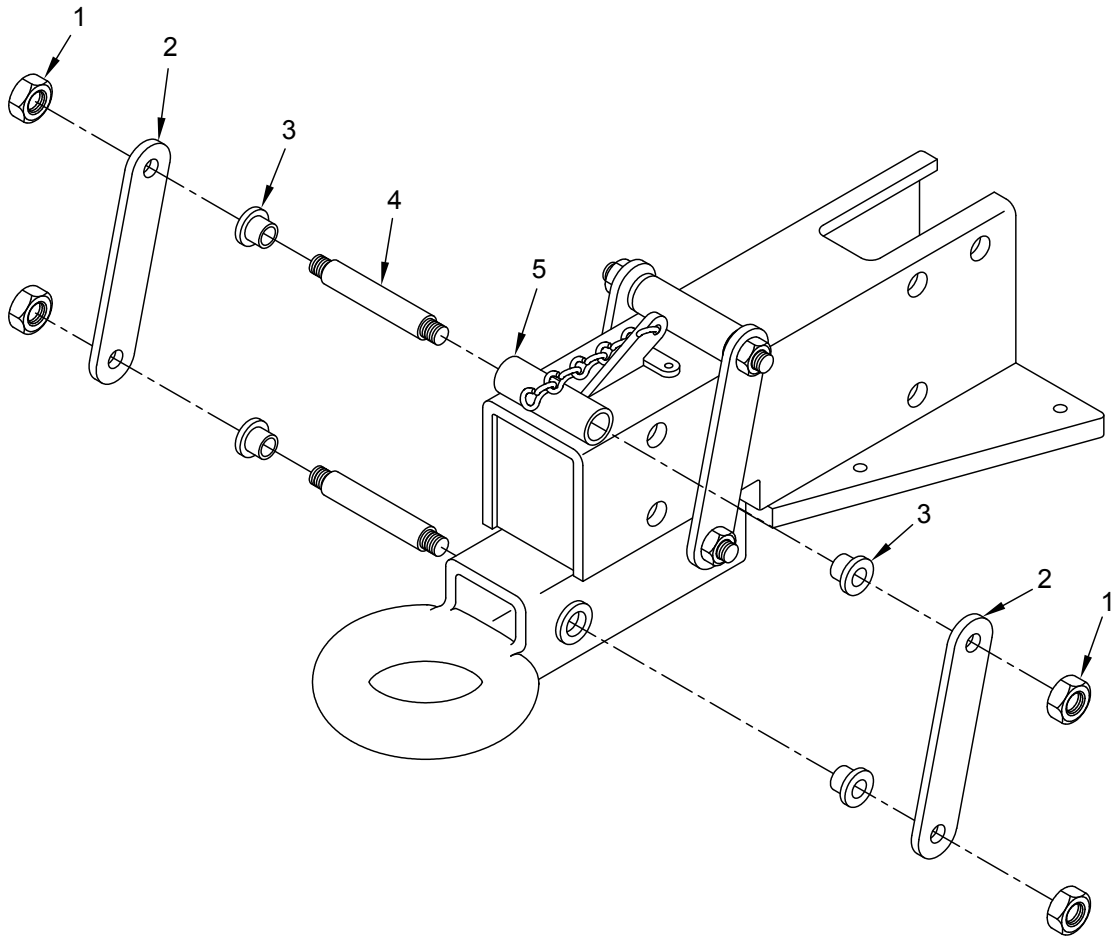


Figure 1. Brake Actuator Mounting Brackets Removal/Replacement.

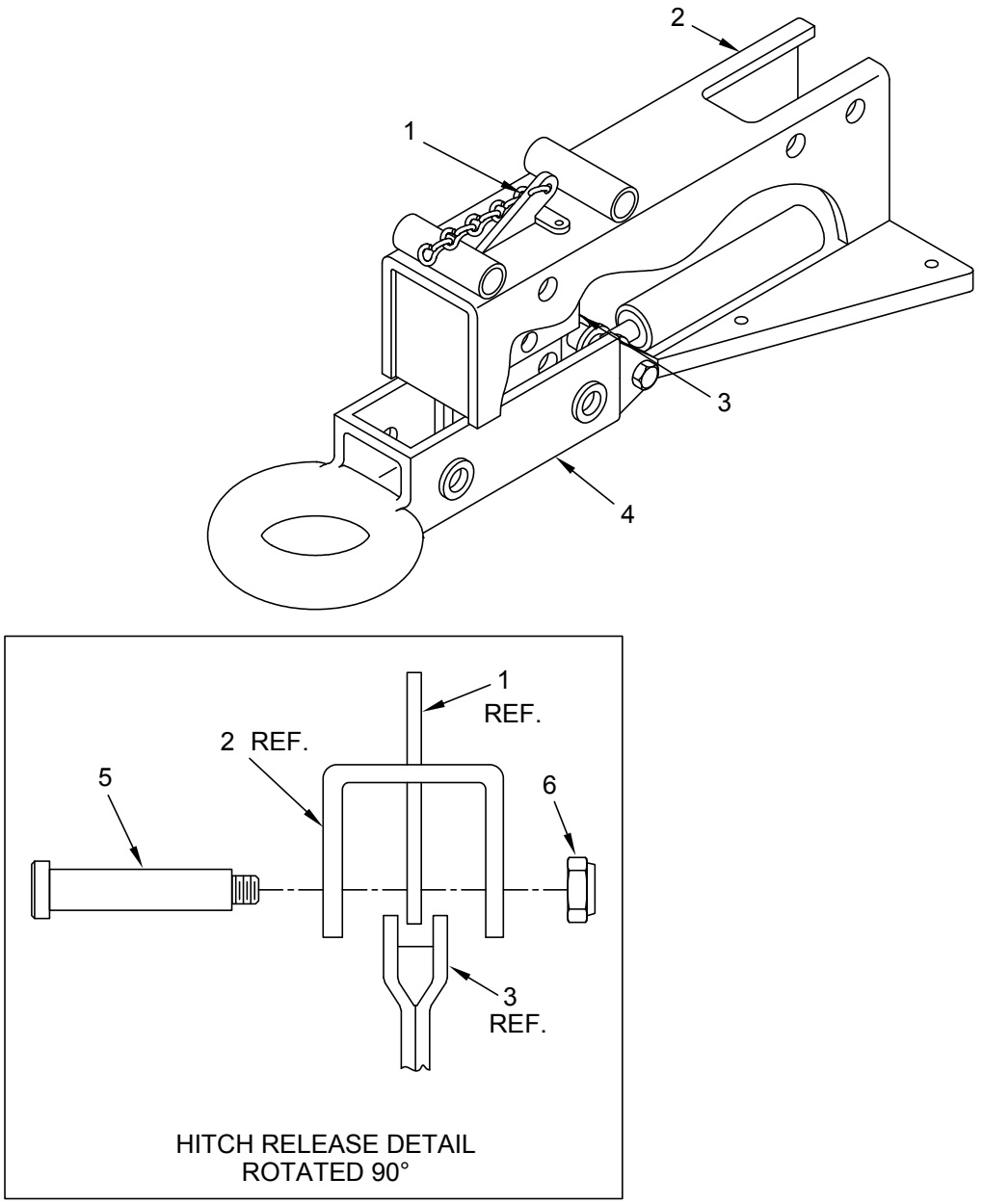


Figure 2. Tow Pintle and Breakaway Lever Removal/Replacement.

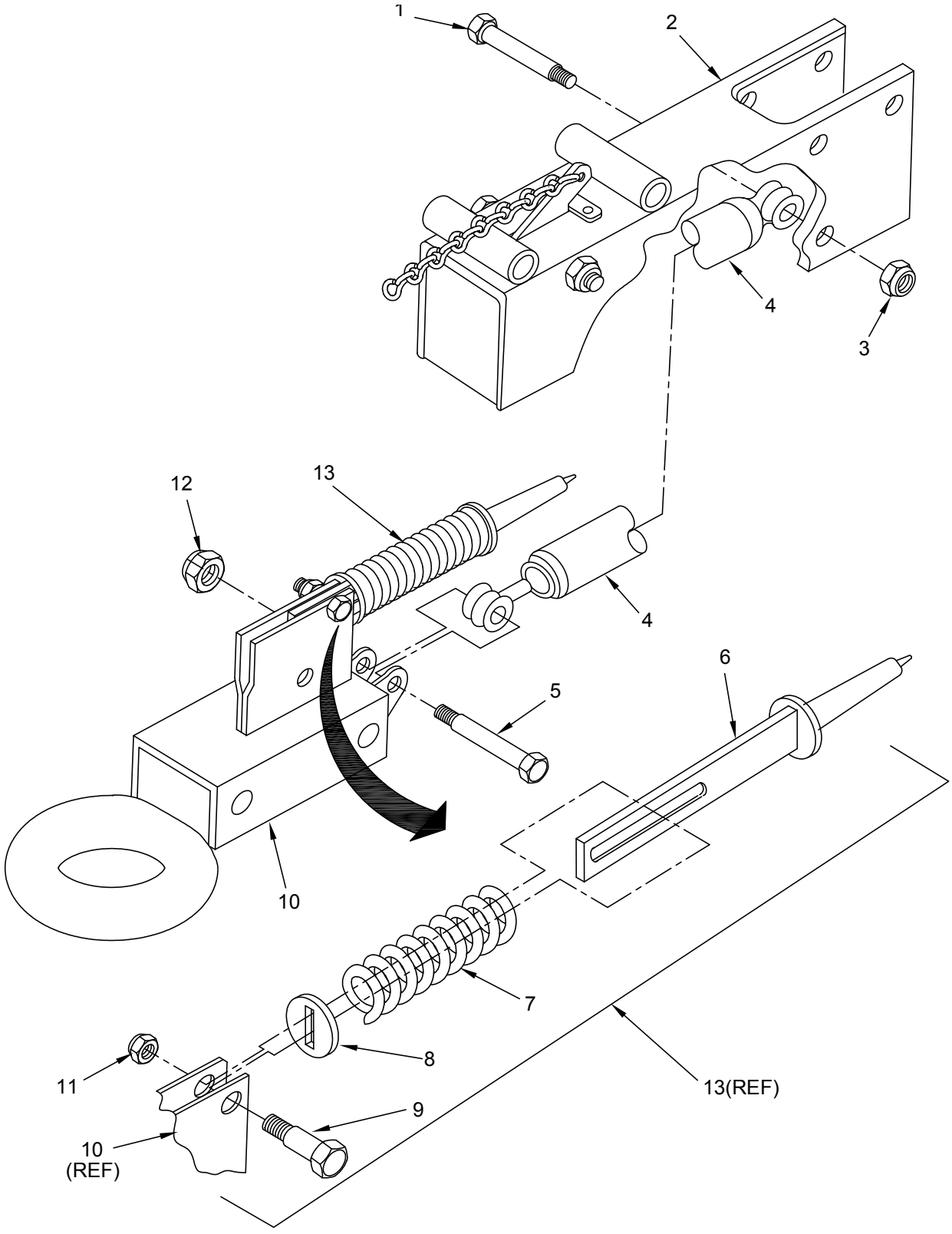


Figure 3. Brake Actuator Shock Absorber and Hydraulic Push Rod Removal/Replacement.

END OF TASK

BRAKE ACTUATOR ASSEMBLY REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0162, Item 1)
Standard Automotive Tool Set (WP 0162, Item 5)

Materials/Parts
Actuator assembly

Personnel Required
Two

Reference
WP 0067, WP 0127

Equipment Condition
Trailer parked in operational position
Handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

BRAKE ACTUATOR ASSEMBLY (New Version)

NOTE

The new version of the Brake Actuator Assembly features a fixed lunette. This actuator is a "Recessed" 4 Bolt Type.

REMOVAL

1. Remove main hydraulic brake line from master cylinder (refer to WP 0127, if necessary).
2. Remove two bolts (Figure 4, Item 6), split lock washers (Figure 4, Item 7), and flat washers (Figure 4, Item 8) that secure brake actuator assembly (Figure 4, Item 1) to trailer (Figure 4, Item 9) from underneath trailer.
3. Remove two bolts (Figure 4, Item 2), split lock washers (Figure 4, Item 4), locknuts (Figure 4, Item 5), and four flat washers (Figure 4, Item 3) that secure brake actuator assembly (Figure 4, Item 1) to trailer (Figure 4, Item 9) from above trailer.
4. Carefully lift and remove actuator assembly (Figure 4, Item 1) from trailer tongue (Figure 4, Item 9).

END OF TASK

REPLACEMENT

1. Place actuator assembly (Figure 4, Item 1) into recessed area of trailer tongue (Figure 4, Item 9).
2. From underneath the trailer tongue and actuator assembly, insert two bolts (Figure 4, Item 6), flat washers (Figure 4, Item 8), and split washers (Figure 4, Item 7) through trailer tongue (Figure 4, Item 9) and actuator assembly (Figure 4, Item 1).
3. From above the trailer tongue, insert two bolts (Figure 4, Item 2) and flat washers (Figure 4, Item 4) through actuator assembly (Figure 1, Item 1) and trailer tongue (Figure 1, Item 9). Secure with two flat washers (Figure 4, Item 3), split washers (Figure 4, Item 4), and lock nuts (Figure 4, Item 5) (refer to WP 0067 for torque requirements).
4. Attach main hydraulic brake line to master cylinder (refer to WP 0127, if necessary).
5. Fill master cylinder and bleed brakes as necessary (refer to WP 0127).

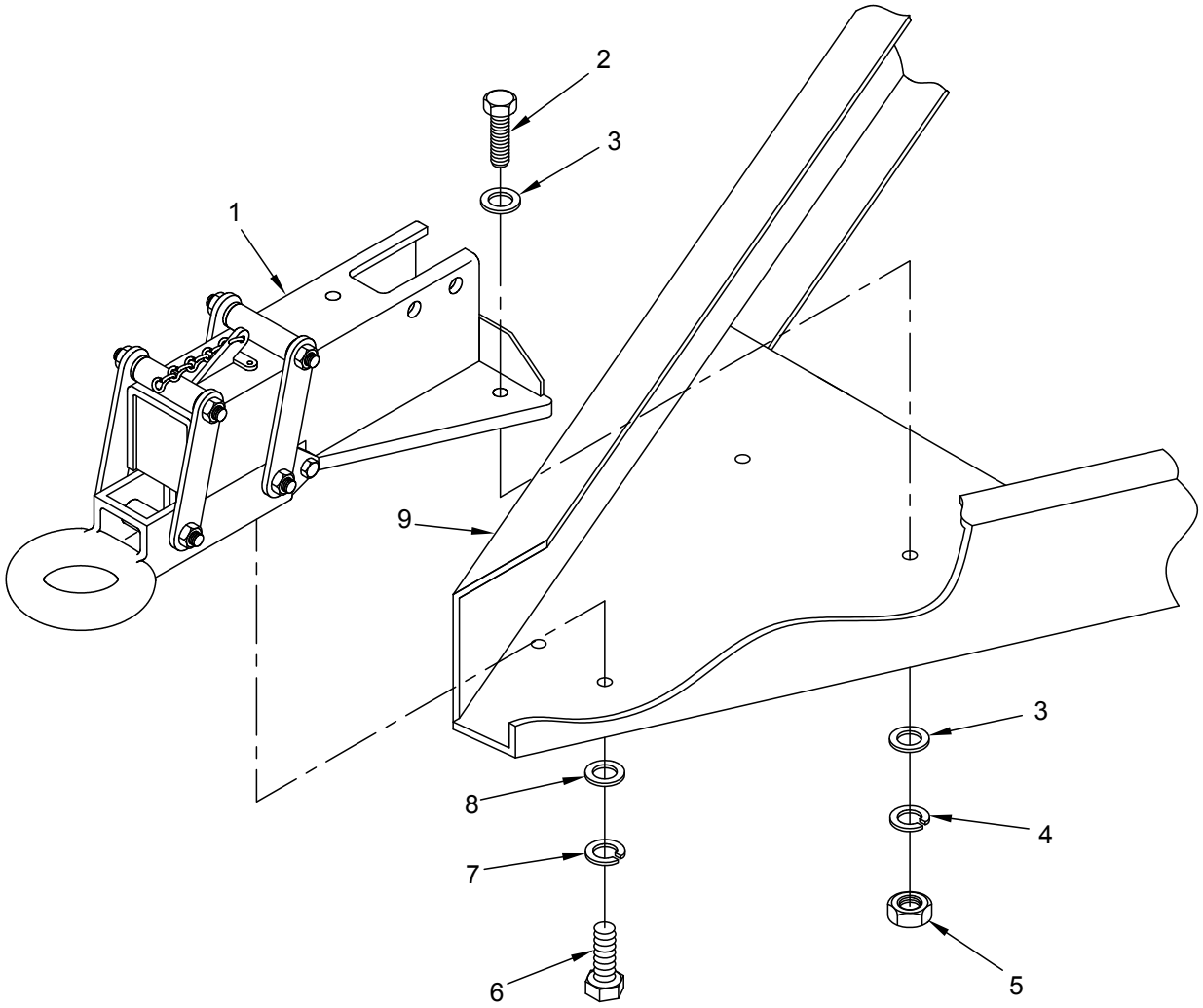


Figure 4. Brake Actuator Assembly (New Version) Removal/Replacement.

END OF TASK

BRAKE ACTUATOR ASSEMBLY (Old Version)

NOTE

The old version of the Brake Actuator Assembly features a fixed lunette. This actuator is side-bolted and is a 6 BOLT-ON Type.

If removing a brake actuator that has an adjustable lunette, replace with one that has a fixed lunette.

REMOVAL

1. Remove main hydraulic brake line from master cylinder (refer to WP 0127, if necessary).
2. Remove six lock nuts (Figure 5, Item 5), twelve flat washers (Figure 5, Item 4), and six bolts (Figure 5, Item 3) from actuator assembly (Figure 5, Item 1).
3. Remove actuator assembly (Figure 5, Item 1) from trailer tongue (Figure 5, Item 2).

END OF TASK

REPLACEMENT

1. Place actuator assembly (Figure 5, Item 1) onto trailer tongue (Figure 5, Item 2).
2. Insert six bolts (Figure 5, Item 3) and twelve washers (Figure 5, Item 4) into actuator assembly (Figure 5, Item 1) and trailer tongue (Figure 5, Item 2). Secure with six lock nuts (Figure 5, Item 5) (refer to WP 0067 for torque requirements).
3. Attach main hydraulic brake line to master cylinder (refer to WP 0127, if necessary).
4. Fill master cylinder and bleed brakes as necessary (refer to WP 0127).

NOTE

Any brake actuator with an adjustable lunette needs to be replaced with a brake actuator that has a fixed lunette.

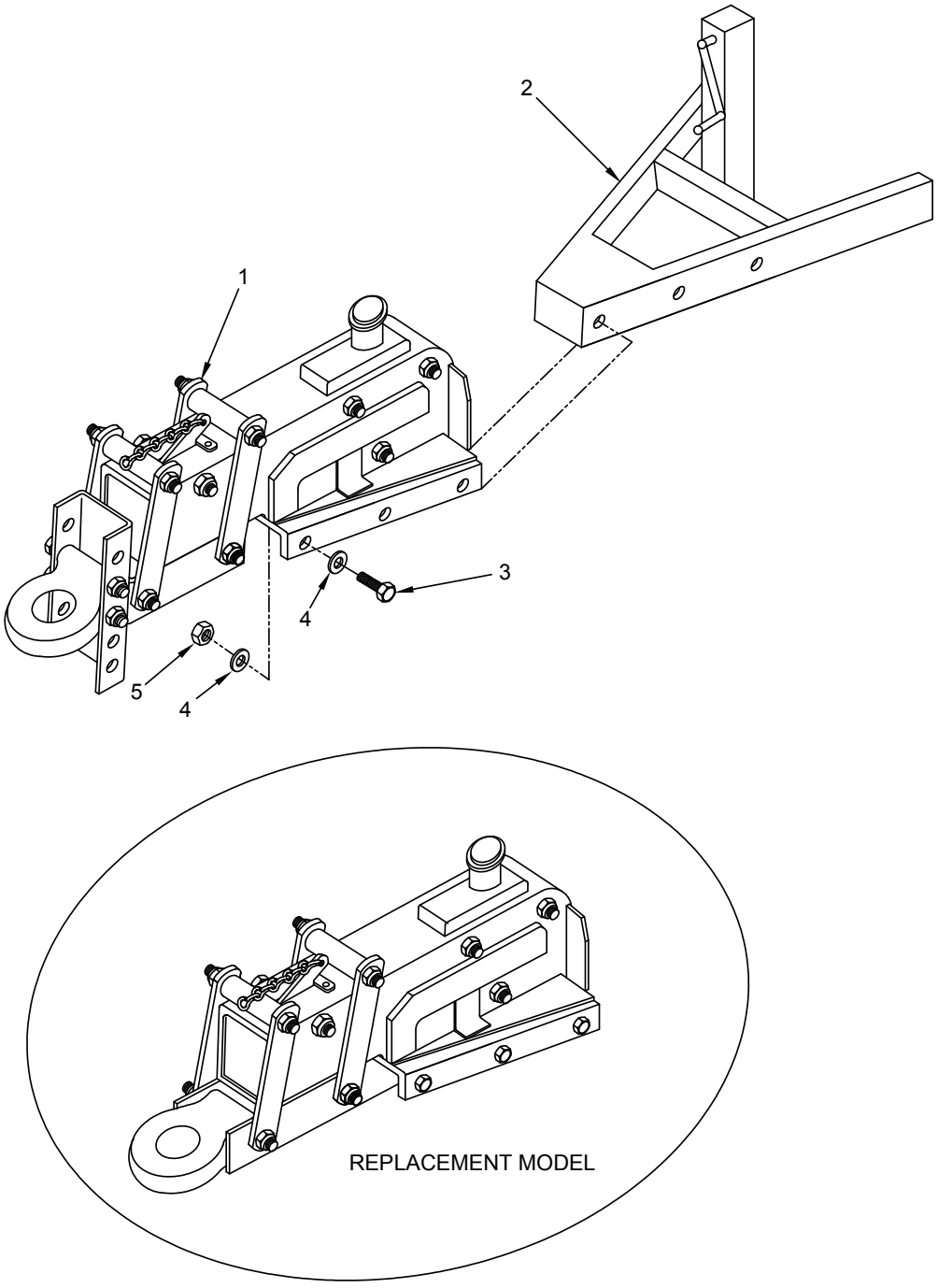


Figure 5. Brake Actuator Assembly Removal/Replacement.

END OF TASK

HAND BRAKE ASSEMBLY REMOVAL/INSPECT/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0165, Item 1)

Materials/Parts
Hand brake assembly
Dry cleaning solvent (WP 0168, Item 11)
Cloth, cleaning (WP 0168, Item 14)

Personnel Required
One

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

REMOVAL

1. Unlock hand brake to be removed.
2. Turn adjustment knob (Figure 6, Item 17) on hand brake lever to be removed to provide slack in cable (Figure 6, Item 3).
3. Remove two locknuts (Figure 6, Item 13), two spacers (Figure 6, Item 14), and two bolts (Figure 6, Item 15) securing hand brake assembly (Figure 6, Item 16) to frame. Discard locknuts.
4. Remove two bolts (Figure 6, Item 5), spacers (Figure 6, Item 6), and lock nuts (Figure 6, Item 9) from hand brake lever assembly (Figure 6, Item 16). Retain front (Figure 6, Item 7) and back (Figure 6, Item 8) cable mounting plates.
5. Using long nose pliers, remove cotter pin (Figure 6, Item 2) from clevis pin (Figure 6, Item 18) and remove clevis pin and washer (Figure 6, Item 1) from hand brake lever assembly (Figure 6, Item 16). Discard cotter pin.
6. Remove cable (Figure 6, Item 3) from hand brake lever assembly (Figure 6, Item 16).

END OF TASK

INSPECT

WARNING

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves and use solvent only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F to 138°F (38°C to 59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. If reusing any components of hand brake assembly, clean components with dry cleaning solvent and allow to dry.
2. Inspect hand brake cable end (Figure 6, Item 19) for excessive wear or damage. Replace if necessary.
3. Inspect clevis pin (Figure 6, Item 18) for excessive wear or damage. Replace if necessary.
4. Inspect cable assembly (Figure 6, Item 3) for frays, cracks, distortion, or seized cable in sheath. Replace if necessary.
5. Inspect all threaded surfaces for damage. Replace any component if damaged.
6. Inspect hand brake lever (Figure 6, Item 4) and replace if necessary.

END OF TASK

REPLACEMENT

CAUTION

Do not push cable back through sheath. Cable may disconnect from hand brake lever in wheel assembly which will cause hand brake failure.

1. Install clevis pin (Figure 6, Item 18) and washer (Figure 6, Item 1) through hand brake assembly (Figure 6, Item 16), hand brake lever (Figure 6, Item 4) and hand brake cable (Figure 6, Item 3) and secure with cotter pin (Figure 6, Item 2).
2. Position front (Figure 6, Item 7) and back (Figure 6, Item 8) cable mounting plates around hand brake cable (Figure 6, Item 3).
3. Install two bolts (Figure 6, Item 5), spacers (Figure 6, Item 6), and nuts (Figure 6, Item 9) into hand brake lever assembly (Figure 6, Item 16).
4. Install two bolts (Figure 6, Item 15), two spacers (Figure 6, Item 14), and two new locknuts (Figure 6, Item 13) securing hand brake assembly (Figure 6, Item 16) to frame.
5. Turn adjustment knob (Figure 6, Item 17) until hand brake lever has one-third slack travel from the disengaged position to the engaged position.
6. Turn adjustment knob slightly to make minor adjustments to hand brake tension.

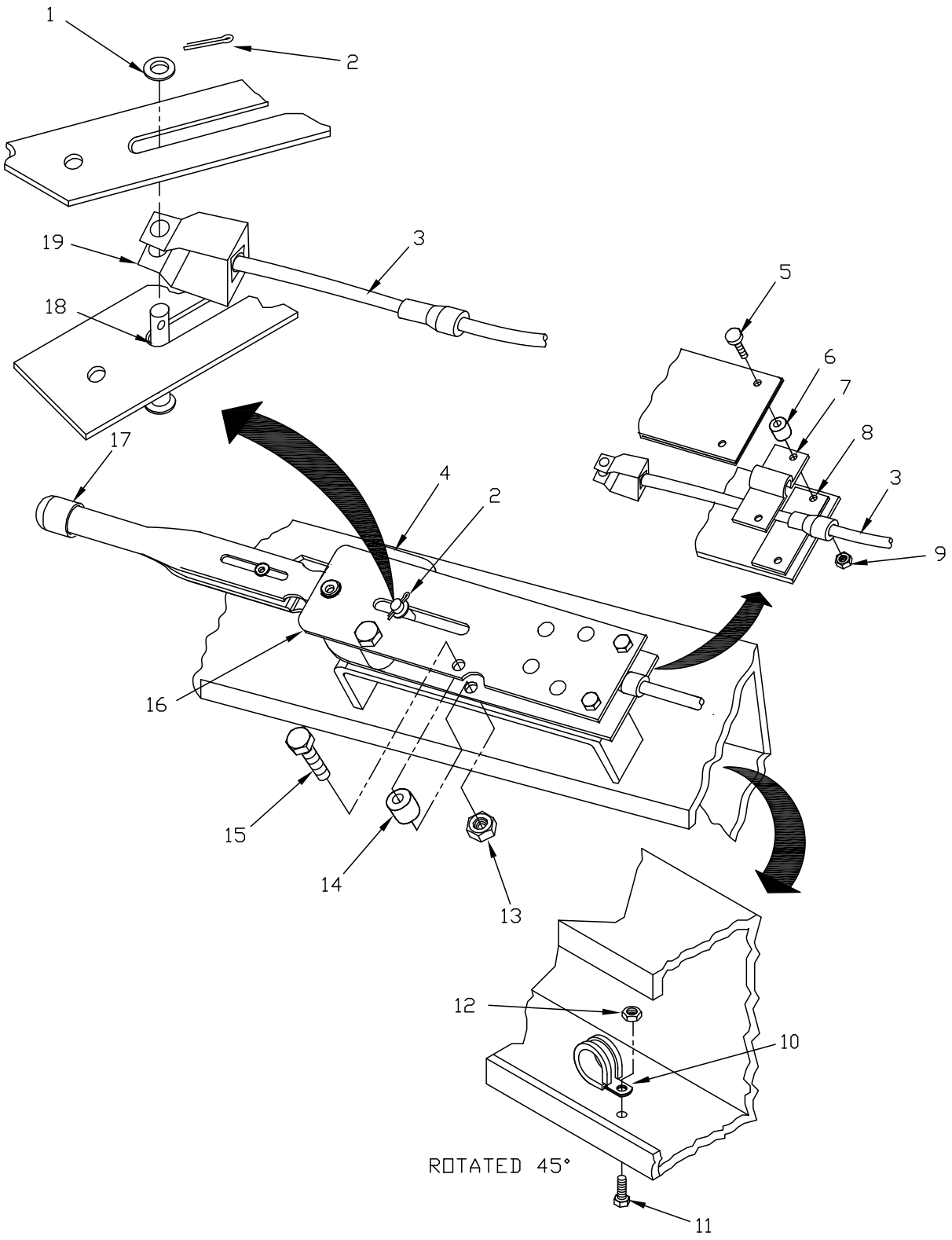


Figure 6. Hand Brake Removal/Replacement.

END OF TASK

HAND BRAKE CABLE AND SHEATH REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit (WP 0162, Item 1)
Standard Automotive Tool Set (WP 0162, Item 5)

Materials/Parts
Hand brake cable and sheath

Personnel Required
Two

Reference
WP 0129, WP 0126

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

REMOVAL

1. Remove hand brake assembly as per this WP.
2. Remove three bolts (Figure 6, Item 11) and lock nuts (Figure 6, Item 12) securing clamps (Figure 6, Item 10) and hand brake cable sheath (Figure 6, Item 3) to frame.
3. Remove clamps (Figure 6, Item 10) from cable sheath (Figure 6, Item 3).
4. Remove hand brake cable (Figure 6, Item 3) from frame.
5. Remove tire and wheel assembly as per (WP 0129).
6. Remove brake hub/drum as per (WP 0126).
7. Using a flat tip screw driver pry the end of the parking brake cable (Figure 7, Item 5) from the parking brake lever (Figure 7, Item 3).
8. Grasp the nut (Figure 7, Item 7) on the lock securing the outer brake cable (Figure 7, Item 1) to the back of the backing plate (Figure 7, Item 4) with vice grips or channel locks.
9. While pressing on the internal flanges (Figure 7, Item 6), using a twisting motion twist and pull the brake cable lock (Figure 7, Item 2) away from the backing plate (Figure 7, Item 4) to release.
10. Remove brake cable (Figure 7, Item 2).

END OF TASK

REPLACEMENT

1. Insert cable (Figure 7, Item 1) through hole in backing plate (Figure 7, Item 4).
2. Holding nut (Figure 7, Item 7) with vice grips or channel locks, twist and push cable into hole in back of backing plate (Figure 7, Item 4) to lock internal flanges (Figure 7, Item 6) into position.
3. Using needle nose channel locks, pull spring back from tip of cable to expose cable.
4. Lower cable (Figure 7, Item 5) into groove on hand brake lever (Figure 7, Item 3) so that clip is fully seated in lever.
5. Release needle nose channel locks.
6. Place clamps in approximate locations on cable (Figure 6, Item 3) and place cable in approximate location along frame.
7. Install three bolts (Figure 6, Item 11) and lock nuts (Figure 6, Item 12) to secure clamps (Figure 6, Item 10) and hand brake cable sheath (Figure 6, Item 3) to frame.
8. Install hand brake assembly as per this WP.
9. Replace brake drum as per (WP 0126).
10. Replace tire and wheel assembly as per (WP 0129).

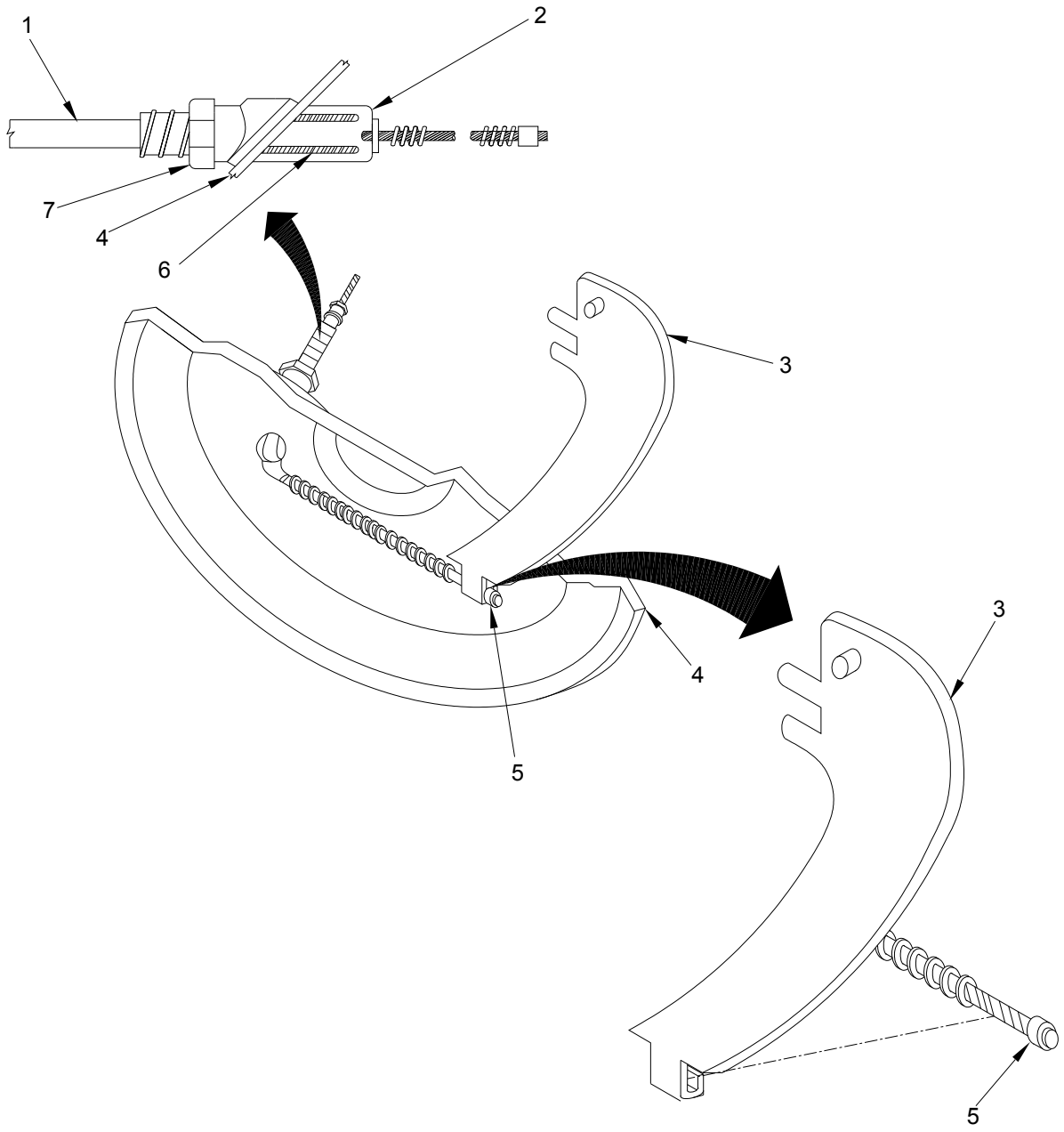


Figure 7. Hand Brake and Sheath Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
TRAILER TIRE AND WHEEL ASSEMBLY

GENERAL

This work package provides information on the service, removal and replacement of the trailer tire and wheel assembly.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that TMSS-MED is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

TIRE AND WHEEL ASSEMBLY SERVICE/REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
Standard automotive tool set (WP 0165, Item 1)
Jack stand
Tire gauge

Materials/Parts
Wheel and run-flat assembly

Personnel Required
Two

References
WP 0005

Equipment Condition
Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked
ECU shut down
Genset shut down

SERVICE

1. Remove and retain tire valve cover.
2. Place tire pressure gauge on air valve and press down firmly. Tire pressure gauge should read 17 psi for off-road and 20 psi for on road.
3. Read the tire pressure indicated on the gauge.
4. If necessary, add or delete air.
5. Repeat steps 2 through 4 until appropriate reading on tire pressure gauge is obtained.
6. Replace valve cover.

END OF TASK

REMOVAL

WARNING

When the following procedure is being performed, the trailer is in a very unstable position. This procedure should be performed in a timely manner and the trailer should not be left unattended. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

Personnel performing this procedure should have another person near by incase an adverse situation occurs. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Prior to performing the following procedure ensure that TMSS-MED is level and ground is stable (not soggy or soft). Jack could sink into soft or unstable ground Injury to personnel, or damage to TMSS-MED trailer and/or its components could result from trailer suddenly rolling or tipping.

REMOVAL – Continued

WARNING

Tire and wheel assembly weight in excess of 110 lbs. Removal and replacement require a two person lift to avoid personal injury.

CAUTION

Prior to performing the following procedure ensure that TMSS-MED is out of service. No power cables or duct should be connected to the ECU or Genset. Failure to observe this caution could result in serious damage to the TMSS-MED trailer and/or its contents.

1. Remove all loose items from trailer and cargo area.
2. Verify that ECU has been shut down in accordance with ECU Stop Procedure (WP 0005).
3. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF. (WP 0005, Genset Stop Procedure).
4. Verify that trailer wheels are chocked, hand brakes are locked.

NOTE

If lug nut does not break loose, do not attempt to force, wheel stud could break. Threads on some wheel studs are reversed (right is loose, left is tight).

5. Loosen but do not remove eight lug nuts (Figure 1, Item 1).
6. Place 3 ton hydraulic jack under trailer frame near wheel assembly (Figure 1, Item 2) to be removed.

NOTE

If tire is flat when performing the following step, trailer will need to be raised to a height sufficient enough to install a fully inflated wheel assembly (Figure 1, Item 2).

Prior to raising trailer make sure that stabilizer leg on opposite side of trailer is not down.

7. Using three-ton jack, raise trailer to sufficient height where fully inflated wheel assembly (Figure 1, Item 2) may be installed.
8. Place three-ton jack stand (Figure 1, Item 4) under trailer axle between wheel assembly (Figure 1, Item 2) and axle mount. Raise jack stand (Figure 1, Item 4) to meet trailer axle. Lower trailer onto jack stand (Figure 1, Item 4).

REMOVAL – Continued

WARNING

Never remove tire and wheel assembly with trailer supported on hydraulic jack. Jack may collapse, causing injury to personnel and damage to equipment.

When the following step is being performed, the trailer is in a very unstable position. This procedure should be performed in a timely manner and the trailer should not be left unattended. Failure to observe this warning can result in serious injury or death to personnel or damage to the TMSS-MED trailer and/or its contents.

9. Remove and retain eight lug nuts (Figure 1, Item 1).

10. Remove wheel assembly (Figure 1, Item 2) and set aside.

END OF TASK

REPLACEMENT

1. Verify that trailer is high enough to accept wheel assembly (Figure 1, Item 2).

NOTE

Prior to installing wheel assembly, perform visual inspection of trailer area now visible by tire assembly being removed. If any leaks or other visible damage is present, notify your supervisor.

Prior to installing wheel assembly, perform visual inspection of wheel assembly. Make sure tread is not excessively worn, no excessive cracking or wear of side walls or no deterioration of rubber is present.

Prior to installing wheel assembly check pressure (off-road - 17 psi; on road -20 psi). If necessary adjust pressure.

2 Install wheel assembly (Figure 1, Item 2) by aligning lug nut studs (Figure 1, Item 3) with corresponding holes in wheel assembly (Figure 1, Item 2).

CAUTION

When the following step is being performed, do not force lug nuts or cross threads. Failure to observe this caution can result in damage to the TMSS-MED trailer.

3. Keeping wheel assembly (Figure 1, Item 2) straight up and down, slide wheel assembly (Figure 1, Item 2) onto studs (Figure 1, Item 3) and hold back. Install eight lug nuts (Figure 1, Item 1) and tighten finger tight.

4. Alternately tighten lug nuts using a crossing pattern.

5. Place three-ton hydraulic jack under trailer frame (near wheel assembly (Figure 1, Item 2) being replaced and raise trailer high enough to remove jack stand (Figure 1, Item 4).

6. Slowly lower trailer so that wheel assembly (Figure 1, Item 2) is supporting weight of trailer.

REPLACEMENT – Continued

CAUTION

When the following step is being performed, do not over tighten lug nuts. Studs could break off or wheels could be extremely difficult to remove next time.

7. Using a crossing pattern, verify that all lug nuts (Figure 1, Item 1) are tight. Torque lug nuts to 100 ± 5 lb – ft (136 ± 7 N·m).

8. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

9. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

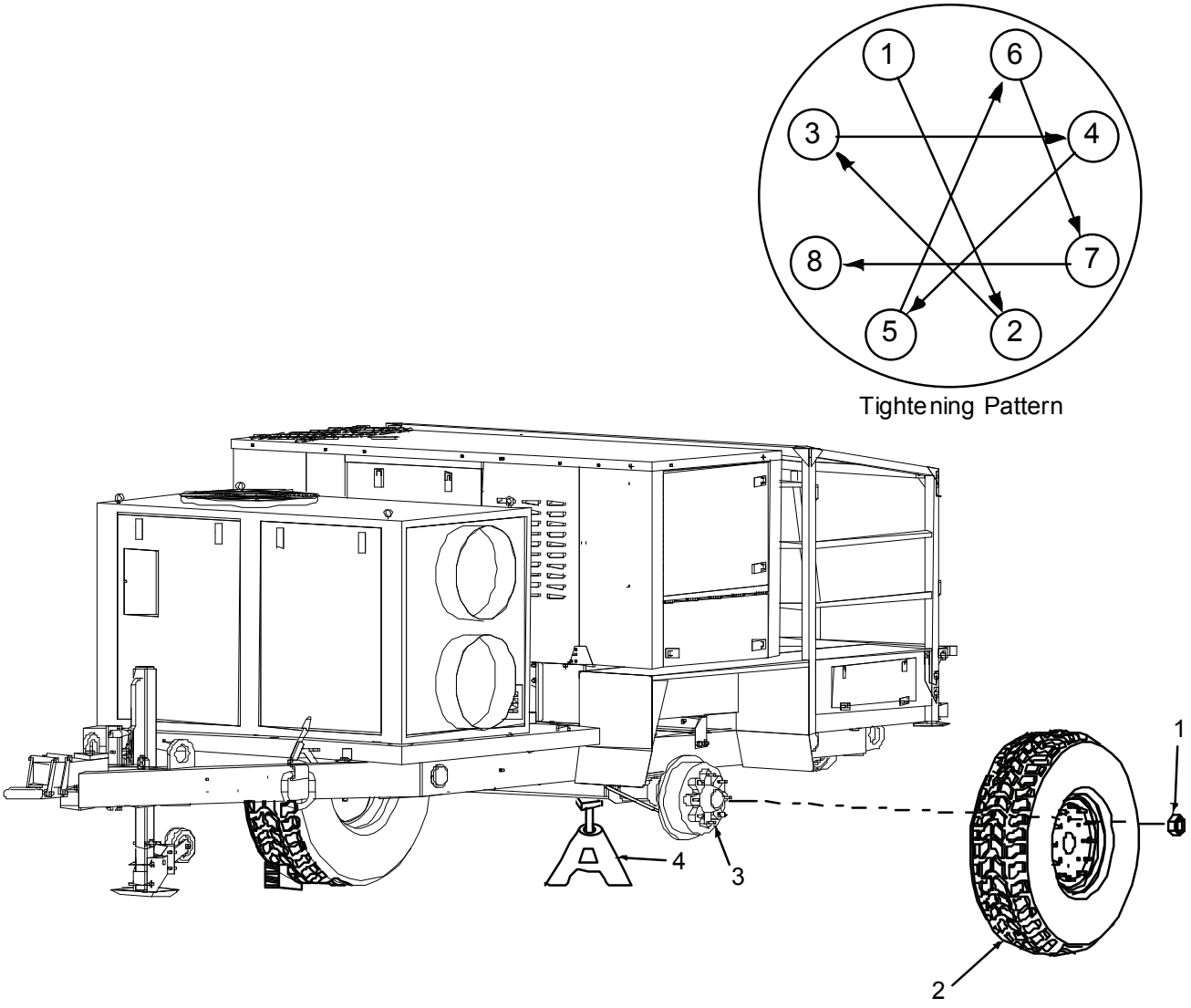


Figure 1. Wheel Assembly Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
TMSS-MED
SHELTER LIGHTING

GENERAL

This work package provides information on the removal and replacement of shelter lighting components. It consists of:

- Fluorescent lamp removal/replacement
- Fuse removal/replacement

WARNING

High voltage and amperage present at electrical connections. Do not disconnect lamp with power applied. To prevent serious injury to personnel or damage to equipment ensure item is de-energized before performing the following procedures.

NOTE

Recommended power-on, operating, and power-off procedures must be followed to ensure proper equipment operation.

Observe all cautions and warnings when performing removal and replacement procedures.

FLUORESCENT LAMP REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Lamp, fluorescent

Personnel Required
One

Equipment Condition
Lighting fixture de-energized

WARNING

If lighting fixture (Figure 1, Item 1) has been in operation components could be hot. To prevent serious injury to personnel, allow sufficient time for components to cool down before performing the following procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Disconnect lighting fixture (Figure 1, Item 1) from power source.
2. Hold the lighting fixture (Figure 1, Item 1) so that the clear panel (Figure 1, Item 3) is facing up.
3. Remove and retain six screws (Figure 1, Item 5) that secure side panel (Figure 1, Item 4) (opposite end of fuse and switch).
4. Tilt the side panel (Figure 1, Item 4) away from lighting fixture (Figure 1, Item 1) and slide down 1/2 inch.
5. Slide the clear panel (Figure 1, Item 3) out of the groove, over the side panel (Figure 1, Item 4).
6. Press red locking tab on connector down and hold to release the fluorescent lamp (Figure 1, Item 2).
7. Carefully lift fluorescent lamp (Figure 1, Item 2) out of connector.

CAUTION

Prior to removing fluorescent lamp (Figure 1, Item 2) inspect for damage. If fluorescent lamp (Figure 1, Item 2) is cracked or broken do not grab with bare hands.

8. Slide fluorescent lamp (Figure 1, Item 2) out and discard of properly.

END OF TASK

REPLACEMENT

NOTE

Prior to installing fluorescent lamp (Figure 1, Item 2) inspect for damage that would prevent functionality. If fluorescent lamp (Figure 1, Item 2) appears burnt (excessive black ring around ends) do not use.

1. Slide fluorescent lamp (Figure 1, Item 2) into securing clamp sleeve.
2. Align connectors with grooves in connection.
3. Press connectors into grooves to lock into place. When fluorescent lamp (Figure 1, Item 2) locks into place red tab will pop up.
4. Slide clear panel (Figure 1, Item 3) over side panel (Figure 1, Item 4) and into groove.
5. Slide the side panel (Figure 1, Item 4) back into position. Groove in side panel (Figure 1, Item 4) should fit over lighting fixture (Figure 1, Item 1).
6. Install six screws (Figure 1, Item 5) that secure side panel (Figure 1, Item 4) to lighting fixture (Figure 1, Item 1).

NOTE

Do not over tighten.

Prior to returning lighting fixture (Figure 1, Item 1) to service, inspect fuse.

7. Connect lighting fixture (Figure 1, Item 1) to power source and return to service.

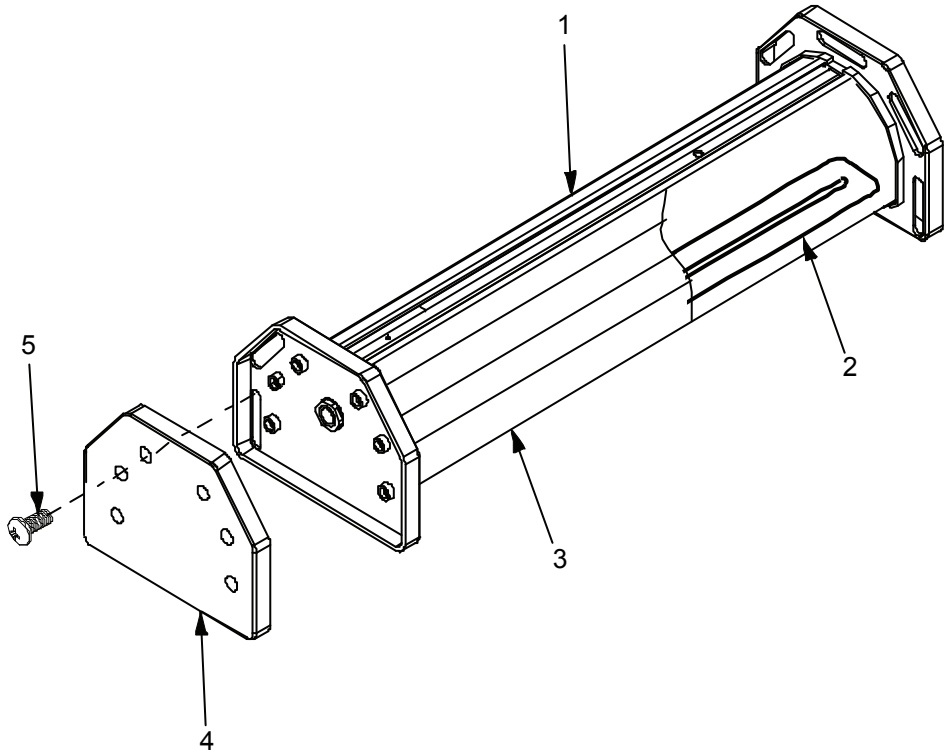


Figure 1. Fluorescent Lamp in Lighting Fixture Removal/Replacement.

END OF TASK

FUSE REMOVAL/REPLACEMENT

INITIAL SETUP:

Tools and Special Tools
General mechanic's tool kit
(WP 0165, Item 1)

Materials/Parts
Fuse

Personnel Required
One

Equipment Condition
Lighting fixture de-energized

WARNING

If lighting fixture has been in operation components could be hot. To prevent serious injury to personnel, allow sufficient time for components to cool down before performing the following procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Disconnect lighting fixture (Figure 2, Item 1) from power source.
2. Press down on fuse cover (Figure 2, Item 2), twist counter-clockwise to release.
3. Remove cover (Figure 2, Item 2) and fuse (Figure 2, Item 3).
4. Remove fuse (Figure 2, Item 3) from cover (Figure 2, Item 2) and properly discard.

END OF TASK

REPLACEMENT

NOTE

Ensure fuse is proper type and value.

If uncertain weather fuse is good, measure fuse with multimeter (set on ohms). If meter indicates short (0 ohms) fuse is good if meter indicates open (high resistance) fuse is bad.

1. Insert fuse (Figure 2, Item 3) into cover (Figure 2, Item 2).
2. Insert assembly into socket, push down and twist clockwise.
3. Connect lighting fixture (Figure 2, Item 1) to power source and return to service.

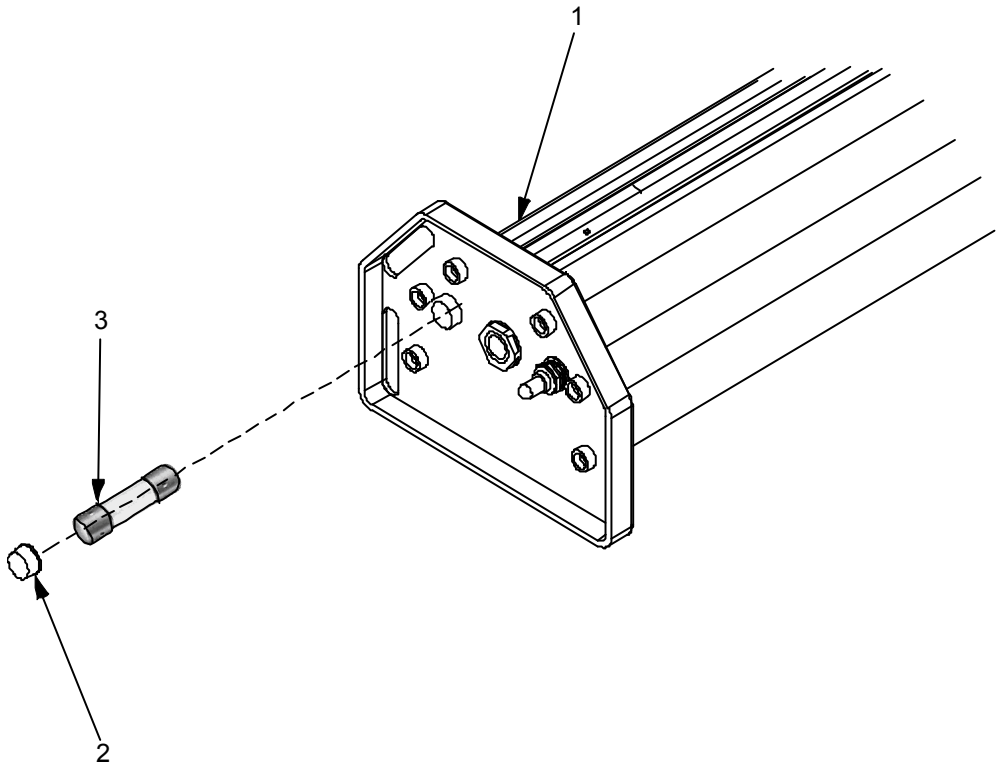


Figure 2. Fuse in Lighting Fixture Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

CHAPTER 9

PARTS INFORMATION
FOR
TMSS-MED

PARTS INFORMATION
TMSS-MED
INTRODUCTION

SCOPE

This RPSTL lists the authorized spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of the field maintenance of the POWER PLANT UTILITY, PU-821/T, PU822A/T. It authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the source, maintenance, and recoverability (SMR) codes.

GENERAL

In addition to the Introduction work package, this RPSTL is divided into the following work packages.

1. Repair Parts List Work Packages. Work packages containing lists of spare and repair parts authorized for use in the performance of maintenance at the levels determined by the MAC/SMR code. These work packages also include parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending Figure and item number sequence. Sending units, brackets, filters, and bolts are listed with the component they mount on. Bulk materials are listed by item name in the Bulk Items work package which follows the last Parts List work package. Repair parts kits are listed separately in their own functional group and work package. Repair parts for reparable special tools are also listed in a separate work package. Items listed are shown on the associated illustrations.

2. Special Tools List Work Packages. This work package lists those special tools, special TMDE, and special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in the DESCRIPTION AND USABLE ON CODE (UOC) column). Tools that are components of common tool sets and/or Class VII are not listed.

3. Cross-Reference Indexes Work Packages. There are two cross-reference indexes work packages in this RPSTL. The National Stock Number (NSN) Index work package refers you to the Figure and item number for each NSN listed in the RPSTL. The Part Number Index work package refers you to the Figure and item number for each part number listed in the RPSTL.

EXPLANATION OF ENTRIES IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES

ITEM NO. (Column (1)). Indicates the number used to identify items called out in the illustration.

SMR CODE (Column (2)). The SMR code containing supply/requisitioning information, maintenance level authorization criteria, and disposition instruction, as shown in the following breakout. This entry may be subdivided into 4 subentries, one for each service.

Table 1. SMR Code Explanation.

Source Code	Maintenance Code		Recoverability Code
XX	XX		X
1st two positions: How to get an item.	3rd position: Who can install, replace, or use the item.	4th position: Who can do complete repair on the item.	5th position: Who determines disposition action on unserviceable items.

NOTE

Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of "Repair" function in a use/user environment in order to restore serviceability to a failed item

Source Code. The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

Table 2. Source Code Explanation.

Source Code	Application/Explanation
PA PB PC PD PE PF PG PH PR PZ	Stock items; use the applicable NSN to requisition/request items with these source codes. They are authorized to the level indicated by the code entered in the third position of the SMR code. **NOTE** Items coded PC are subject to deterioration.
KD KF KB	Items with these codes are not to be requisitioned /requested individually. They are part of a kit that is authorized to the maintenance level indicated in the third position of the SMR code. The complete kit must be requisitioned and applied.
MF-Made at maintainer class MH-Made at below depot/sustainment class ML-Made at SRA MD-Made at depot	Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the P/N in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the bulk material group work package of the RPSTL. If the item is authorized to you by the third position code of the SMR code, but the source code indicates it is made at higher level, order the item from the higher level of maintenance.
AF–Assembled by maintainer class AH–Assembled by below depot sustainment class AL–Assembled by SRA AD–Assembled by depot	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the third position of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
XA	Do not requisition an "XA" coded item. Order the next higher assembly. (Refer to **NOTE** below).
XB	If an item is not available from salvage, order it using the CAGEC and P/N.
XC	Installation drawings, diagrams, instruction sheets, field service drawings; identified by the manufacturer's P/N.
XD	Item is not stocked. Order an XD-coded item through local purchase or normal supply channels using the CAGEC and P/N given, if no NSN is available.

NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes except for those items source coded “XA” or those aircraft support items restricted by requirements of AR 750-1.

Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to use and repair support items. The maintenance codes are entered in the third and fourth positions of the SMR codes as follows:

Third Position. The maintenance code entered in the third position tells you the lowest maintenance class authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to the following classes of maintenance:

Maintenance Code	Application/Explanation
C -	Crew
F -	Maintainer maintenance can remove, replace, and use the item
H -	Below Depot Sustainment maintenance can remove, replace, and use the item.
L -	Specialized repair activity can remove, replace, and use the item.
K -	Contractor facility can remove, replace, and use the item.
Z -	Item is not authorized to be removed, replaced, or used at any maintenance level.
D -	Depot can remove, replace, and use the item.

NOTE

Army will use C in the third position. However, for joint service publications, other services may use O

Fourth position. The maintenance code entered in the fourth position tells you whether or not the item is to be repaired and identifies the lowest maintenance class with the capability to do complete repair (perform all authorized repair functions).

Maintenance Code	Application/Explanation
C -	Crew (operator) is the lowest class that can do complete repair
F -	Maintainer is the lowest class that can do complete repair of the item.
H -	Below Depot Sustainment is the lowest class that can do complete repair of the item.
L -	Specialized repair activity (enter specialized repair activity or TASMG designator) is the lowest class that can do complete repair of the item.

Maintenance Code	Application/Explanation
D -	Depot is the lowest class that can do complete repair of the item.
K -	Complete repair is done at contractor facility.
Z -	Nonreparable. No repair is authorized.
B -	No repair is authorized. No parts or special tools are authorized for maintenance of "B" coded item. However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is shown in the fifth position of the SMR code as follows:

Recoverability Code	Application/Explanation
Z -	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the third position of the SMR code.
F -	Reparable item. When uneconomically reparable, condemn and dispose of the item at the field level.
H -	Reparable item. When uneconomically reparable, condemn and dispose of the item at the below depot sustainment.
D -	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item are not authorized below depot.
L -	Reparable item. Condemnation and disposal not authorized below Specialized Repair Activity (SRA).
A -	Item requires special handling or condemnation procedures because of specific reasons (such as precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

NSN (Column (3)). The NSN(s) for the item is listed in this column.

CAGEC (Column (4)). The Commercial and Government Entity Code (CAGEC) is a five-digit code which is used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.

PART NUMBER (Column (5)). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

NOTE

When you use an NSN to requisition an item, the item you receive may have a different part number from the number listed.

DESCRIPTION AND USABLE ON CODE (UOC) (Column (6)). This column includes the following information:

1. The federal item name, and when required, a minimum description to identify the item.

2. Part numbers of any bulk materials required if the item is to be locally manufactured or fabricated.

3. Hardness Critical Item (HCI). Items that require special handling or procedures to ensure protection against electrostatic pulse (EMP) damage are marked with the letters “HCI”.

4. The statement END OF FIGURE appears below the last item description in column (6) for each Figure in the repair parts list, special tools repair parts, kits, bulk items, and special tools list work packages.

QTY (Column (7)). The QTY (quantity per Figure) column indicates the quantity of the item used in the breakout shown on the illustration/Figure. A “V” appearing in this column instead of a quantity indicates that the quantity is variable and quantity may change from application to application.

EXPLANATION OF CROSS-REFERENCE INDEXES WORK PACKAGES FORMAT AND COLUMNS

1. National Stock Number (NSN) Index Work Package. NSN’s in this index are listed in National Item Identification Number (NIIN) sequence.

STOCK NUMBER Column. This column lists the NSN in NIIN sequence. The NIIN consists of the last nine digits of the NSN. When using this column to locate an item, ignore the first four digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

For example, if the NSN is 5385-01-574-1476, the NIIN is 01-574-1476.

FIG. Column. This column lists the number of the Figure where the item is identified/located. The Figures are in numerical order in the repair parts list and special tools list work packages.

ITEM Column. The item number identifies the item associated with the Figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

2. Part Number (P/N) Index Work Package. Part Numbers in this index are listed in ascending alphanumeric sequence (vertical arrangement of letter and number combinations which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

PART NUMBER Column. This column indicates the part number assigned to the item.

FIG. Column. This column lists the number of the Figure where the item is identified/located in the repair parts list and special tools list work packages.

ITEM Column. The item number is the number assigned to the item as it appears in the Figure referenced in the adjacent Figure number column.

SPECIAL INFORMATION

UOC. The UOC appears in the lower left corner of the Description Column heading. Usable on codes are shown as "UOC:" in the Description Column (justified left) on the first line under the applicable item/nomenclature. Uncoded items are applicable to all models. Examples of the UOCs used in the RPSTL are:

Code	Used On
89W	POWER PLANT UTILITY, PU-821/T
89X	POWER PLANT UTILITY, PU-822A/T

Associated Publications. The publication listed below pertains to the Power Utility Plant, PU-821/T, PU-822A/T.

Publication	Short Title
TM 9-2330-392-14&P	Trailer, Cargo

Fabrication Instructions. Bulk materials required to manufacture items are listed in the bulk material work package of this RPSTL. Part numbers for bulk material are also referenced in the Description Column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in (enter applicable TM number).

Index Numbers. Items which have the word BULK in the Figure column will have an index number shown in the item number column. This index number is a cross-reference between the NSN / Part Number (P/N) Index work packages and the bulk material list in the bulk items work package.

HOW TO LOCATE REPAIR PARTS

1. When NSNs or Part Numbers Are Not Known.

First. Using the table of contents, determine the assembly group to which the item belongs. This is necessary since Figures are prepared for assembly groups and subassembly groups, and lists are divided into the same groups.

Second. Find the Figure covering the functional group or subfunctional group to which the item belongs.

Third. Identify the item on the Figure and note the number(s).

Fourth. Look in the repair parts list work packages for the Figure and item numbers. The NSNs and part numbers are on the same line as the associated item numbers.

2. When NSN Is Known.

First. If you have the NSN, look in the STOCK NUMBER column of the NSN index work package. The NSN is arranged in NIIN sequence. Note the Figure and item number next to the NSN.

Second. Turn to the Figure and locate the item number. Verify that the item is the one for which you are looking for.

3. When Part Number Is Known.

First. If you have the part number and not the NSN, look in the PART NUMBER column of the part number index work package. Identify the Figure and item number.

Second. Look up the item on the Figure in the applicable repair parts list work package.

ABBREVIATIONS

Not Applicable.

END OF WORK PACKAGE

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
POWER PLANT, UTILITY, A1-38283D-001 (PU-821/T), A1-38283D-002 (PU-822A/T)

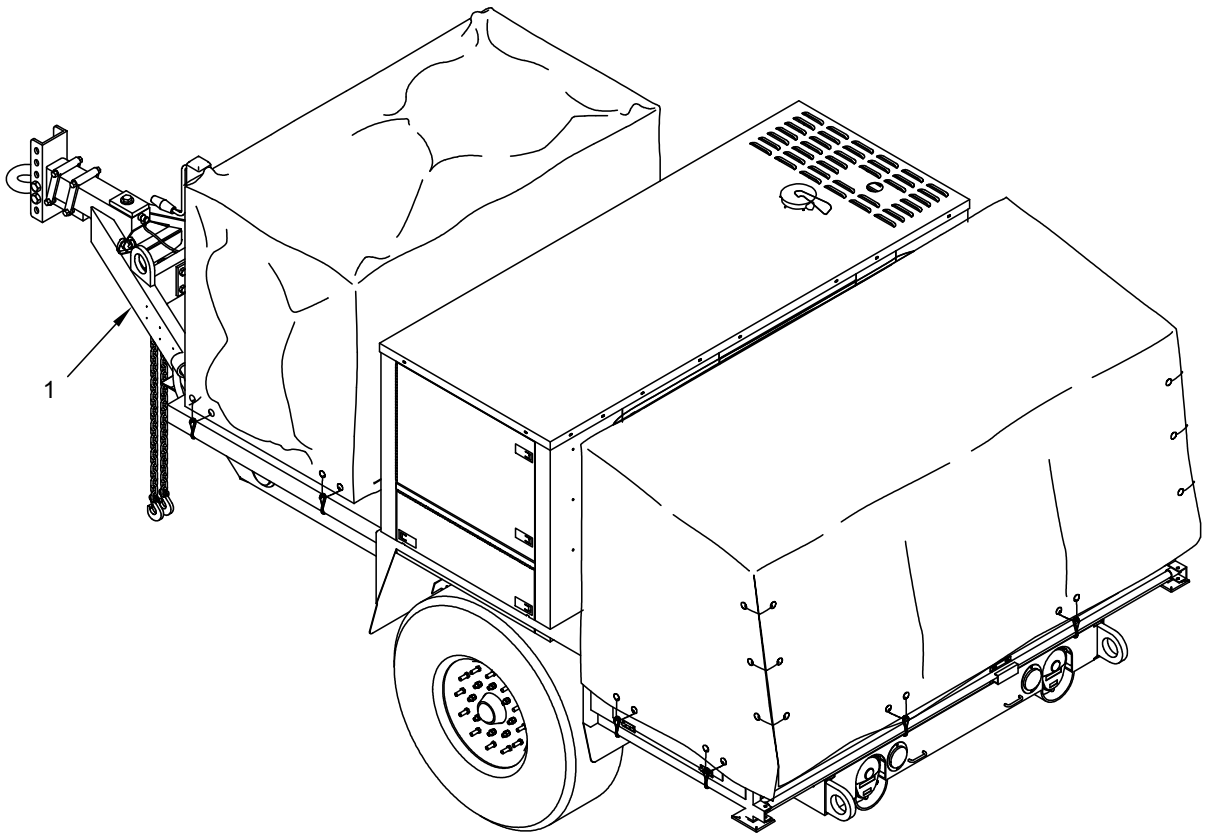


Figure 1. Power Plant, Utility, A1-38283D-001 (PU-821/T), A1-38283D-002 (PU-822A/T).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 00	
					FIGURE 1 POWER PLANT, UTILITY A1-38283D-001(PU821/T), A1-38283D-002(PU822A/T)	
1	PDFDD	8340-01-533-5396	0WFM3	TMSS100G	TENT,MODULAR,GENERAL PURPOSE (SEE FIGURE 2 FOR BREAKDOWN)..... UOC: 89W	1
1	PDFDD	8340-01-533-5344	0WFM3	TMSS100T	TENT,MODULAR,GENERAL PURPOSE (SEE FIGURE 2 FOR BREAKDOWN)..... UOC: 89X	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
TENT, MODULAR, GENERAL PURPOSE SYSTEM, TMSS100/G/TMSS100T

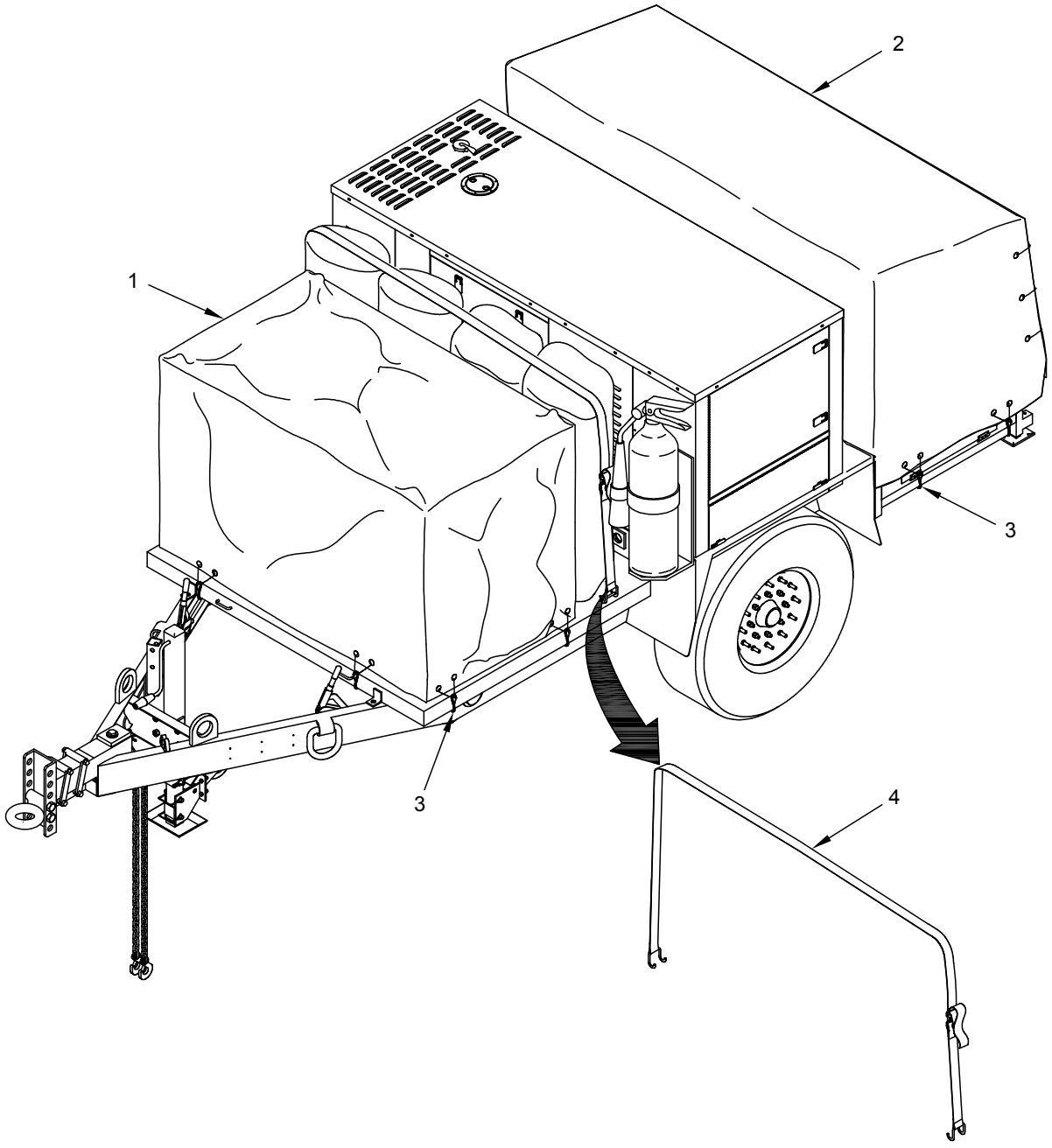


Figure 2. Tent, Modular, General Purpose System, TMSS100G/TMSS100T (Sheet 1 of 2).

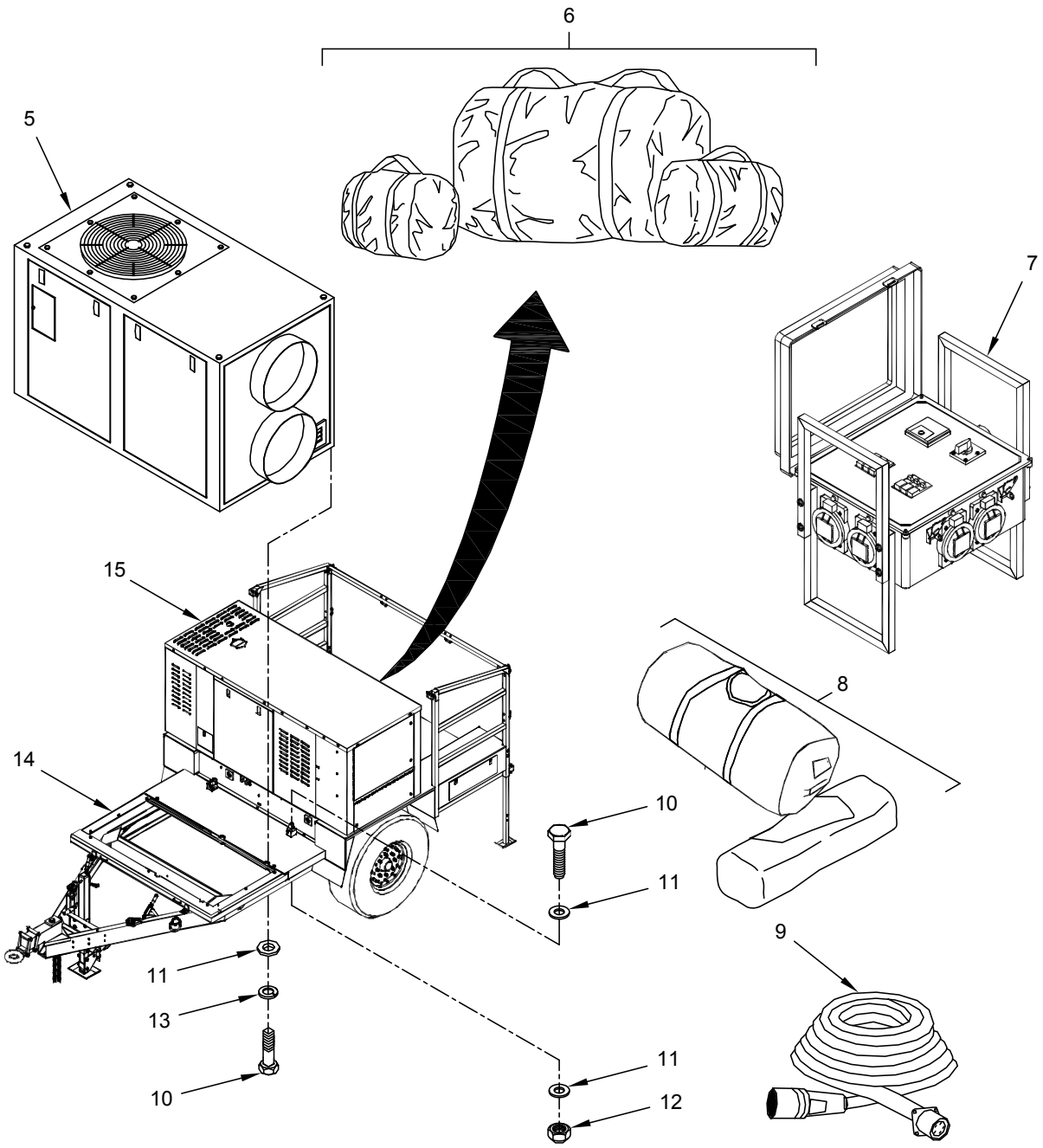


Figure 2. Tent, Modular, General Purpose System, TMSS100G/TMSS100T (Sheet 2 of 2).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 01	
					FIGURE 2 TENT, MODULAR, GENERAL PURPOSE SYSTEM TMSS100G/TMSS100T	
1	PAFZZ	2540-01-558-8455	0WFM3	SH535-0007G	TARPAULIN UOC: 89W	1
1	PAFZZ	2540-01-558-7518	0WFM3	SH535-0007T	COVER, FITTED, VEHICULAR BODY UOC: 89X	1
2	PAFZZ	8340-01-572-0253	0WFM3	SH535-0008G	TARPAULIN UOC: 89W	1
2	PAFZZ	2540-01-558-8554	0WFM3	SH535-0008T	TARPAULIN UOC: 89X	1
3	PAFZZ	5340-01-554-2739	1KDE3	C408115	EYE HOOK	14
4	PAFZZ	3990-01-552-8296	0WFM3	SH535-0006	TIE DOWN,CARGO,VEHICLE	1
5	XBFDD		0WFM3	T256250G	AIR CONDITIONER (SEE FIGURE 3 FOR BREAKDOWN) UOC: 89W	1
5	XBFDD		0WFM3	T256250T	AIR CONDITIONER (SEE FIGURE 3 FOR BREAKDOWN) UOC: 89X	1
6	PACDD	8340-01-538-1822	0WFM3	MXA2000G	TENT (SEE FIGURE 23 FOR BREAKDOWN) UOC: 89W	1
6	PACDD	8340-01-538-1823	0WFM3	MXA2000T	TENT (SEE FIGURE 23 FOR BREAKDOWN) UOC: 89X	1
7	PAFDA	8340-01-491-3057	0WFM3	T2-93000-1	POWER DISTRIBUTION UNIT, TENT	1
8	PAFFF	6230-01-568-4487	0WFM3	H300070	LIGHT SET,TENT (SEE FIGURE 26 FOR BREAKDOWN)	1
9	PAFZZ	6150-01-552-6358	0WFM3	T295004	CABLE ASSEMBLY,POWER, ELECTRICAL	1
10	PAFZZ	5305-01-552-6246	1KDE3	50C175HCS1	SCREW.CAP,HEXAGON HEAD	10
11	PAFZZ	5310-01-554-1192	1KDE3	50N125WSP1	WASHER,FLAT	16
12	PAFZZ	5310-01-559-2446	1KDE3	50CNNE1	NUT,SELF-LOCKING, HEXAGON	6
13	PAFZZ	5310-01-552-6251	1KDE3	50NLOC1	WASHER,LOCK	4

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
14	XBDDD		0WFM3	T215125G	CHASSIS,TRAILER ASSEMBLY (SEE FIGURE 18 FOR BREAKDOWN)..... UOC: 89W	1
14	XBDDD		0WFM3	T215125T	CHASSIS,TRAILER ASSEMBLY (SEE FIGURE 18 FOR BREAKDOWN)..... UOC: 89X	1
15	PAFDD		0WFM3	1007206	GENERATOR,DIESEL ENGINE (SEE FIGURE 8 FOR BREAKDOWN) ..... UOC: 89W	1
15	PAFDD		0WFM3	1007205	GENERATOR,DIESEL ENGINE (SEE FIGURE 8 FOR BREAKDOWN) ..... UOC: 89X	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
AIR CONDITIONER, T256250G/T256250T

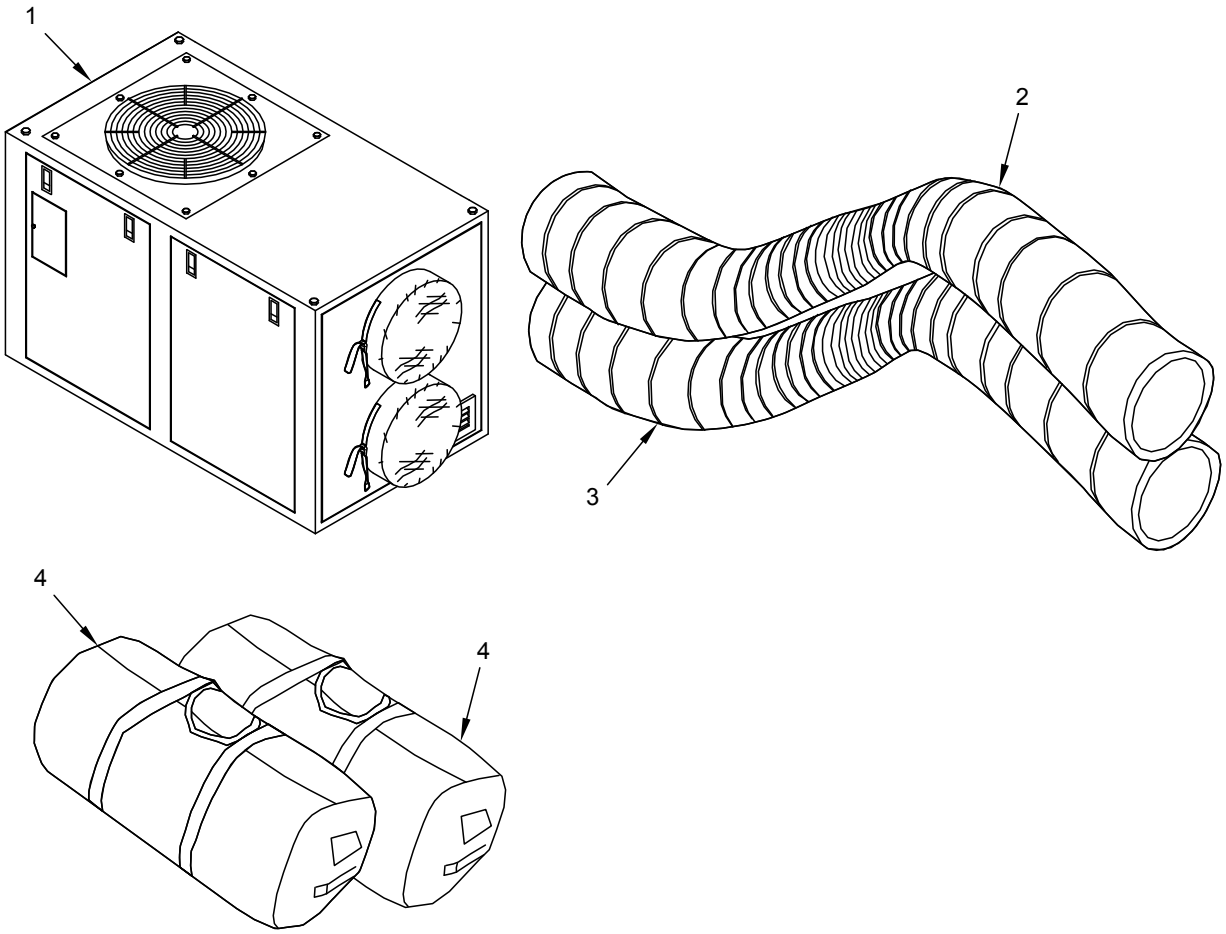


Figure 3. Air Conditioner, T256250G/T256250T.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 0101	
					FIGURE 3 AIR CONDITIONER T256250G/T256250T	
1	XBFDD		0WFM3	T250250G	AIR CONDITIONER ENCLOSURE (SEE FIGURE 4 FOR BREAKDOWN) ..... UOC: 89W	1
1	XBFDD		0WFM3	T250250T	AIR CONDITIONER ENCLOSURE (SEE FIGURE 4 FOR BREAKDOWN) ..... UOC: 89X	1
2	PAFZZ	4720-01-553-5758	0WFM3	T291433	HOSE,AIR DUCT ..... UOC: 89W	1
2	PAFZZ	4720-01-558-9393	0WFM3	T291527	HOSE,AIR DUCT ..... UOC: 89X	1
3	PAFZZ	4720-01-553-5827	0WFM3	T291434	HOSE,AIR DUCT ..... UOC: 89W	1
3	PAFZZ	4720-01-559-2546	0WFM3	T291528	HOSE,AIR DUCT ..... UOC: 89X	1
4	PAFZZ	8105-01-575-2509	0WFM3	A602126	BAG,DUCT TRANSPORT.....	2
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
AIR CONDITIONER ENCLOSURE, T250250G/T250250T

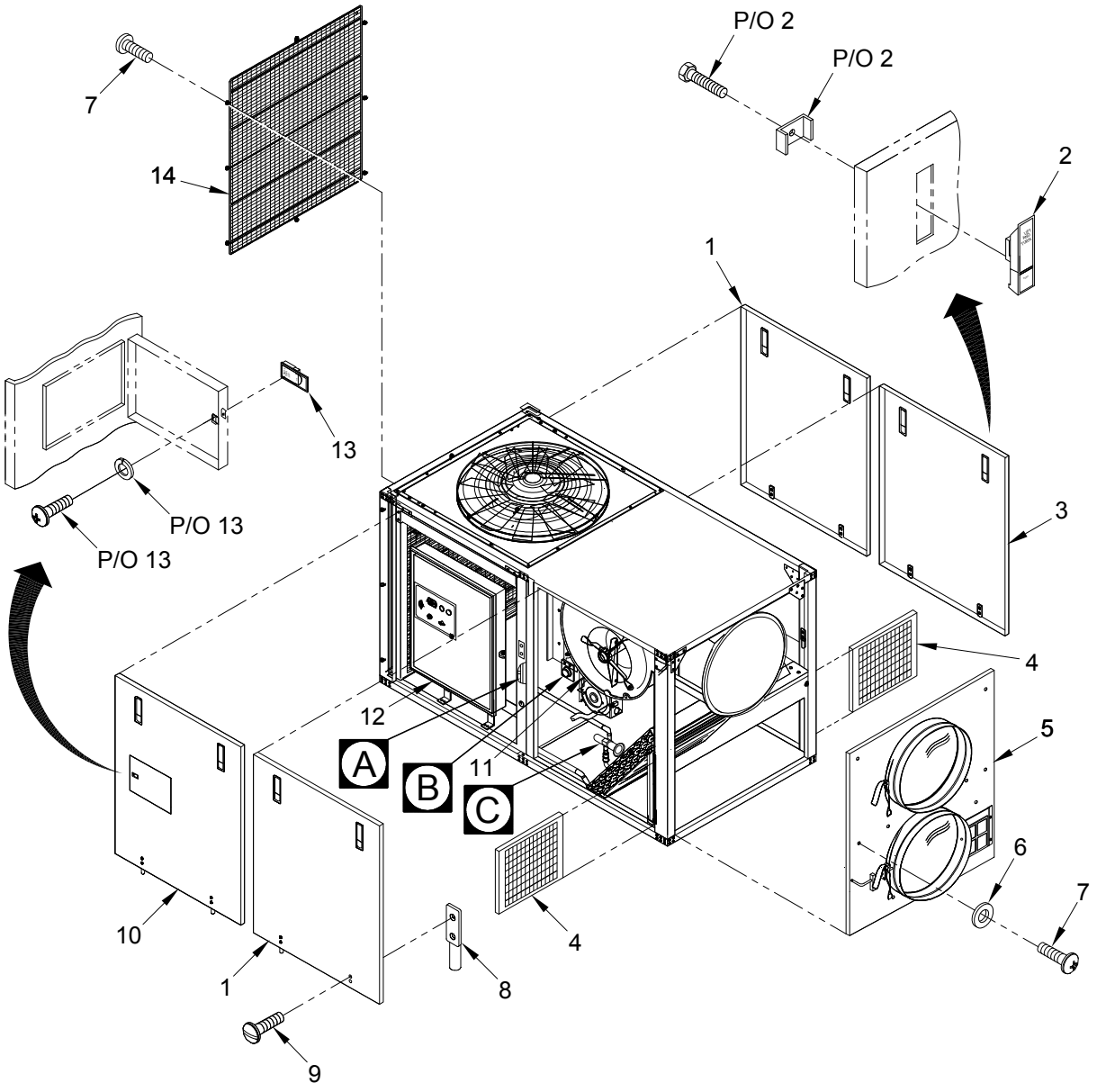


Figure 4. Air Conditioner Enclosure, T250250G/T250250T (Sheet 1 of 5).

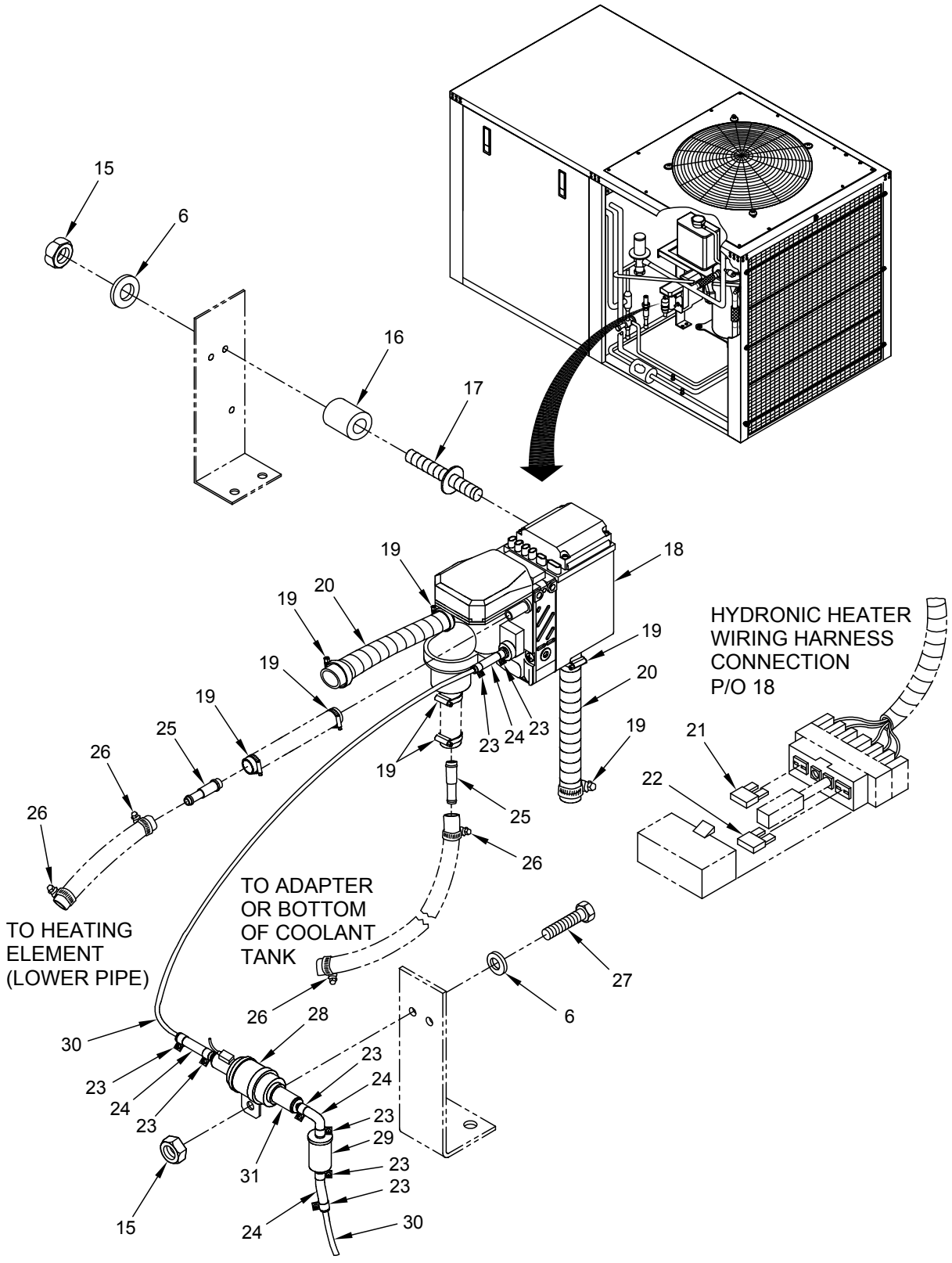


Figure 4. Air Conditioner Enclosure, T250250G/T250250T (Sheet 2 of 5).

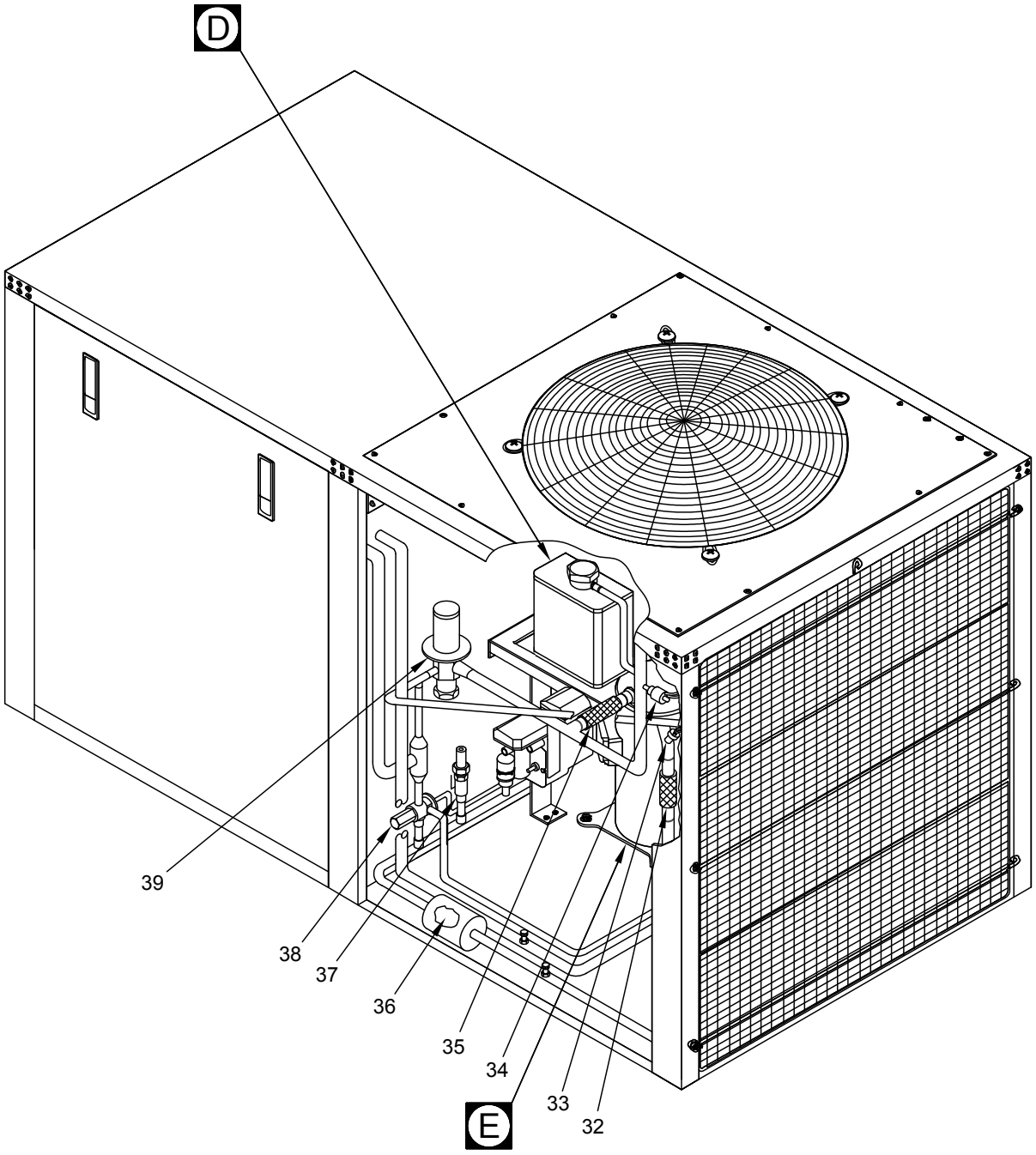


Figure 4. Air Conditioner Enclosure, T250250G/T250250T (Sheet 3 of 5).

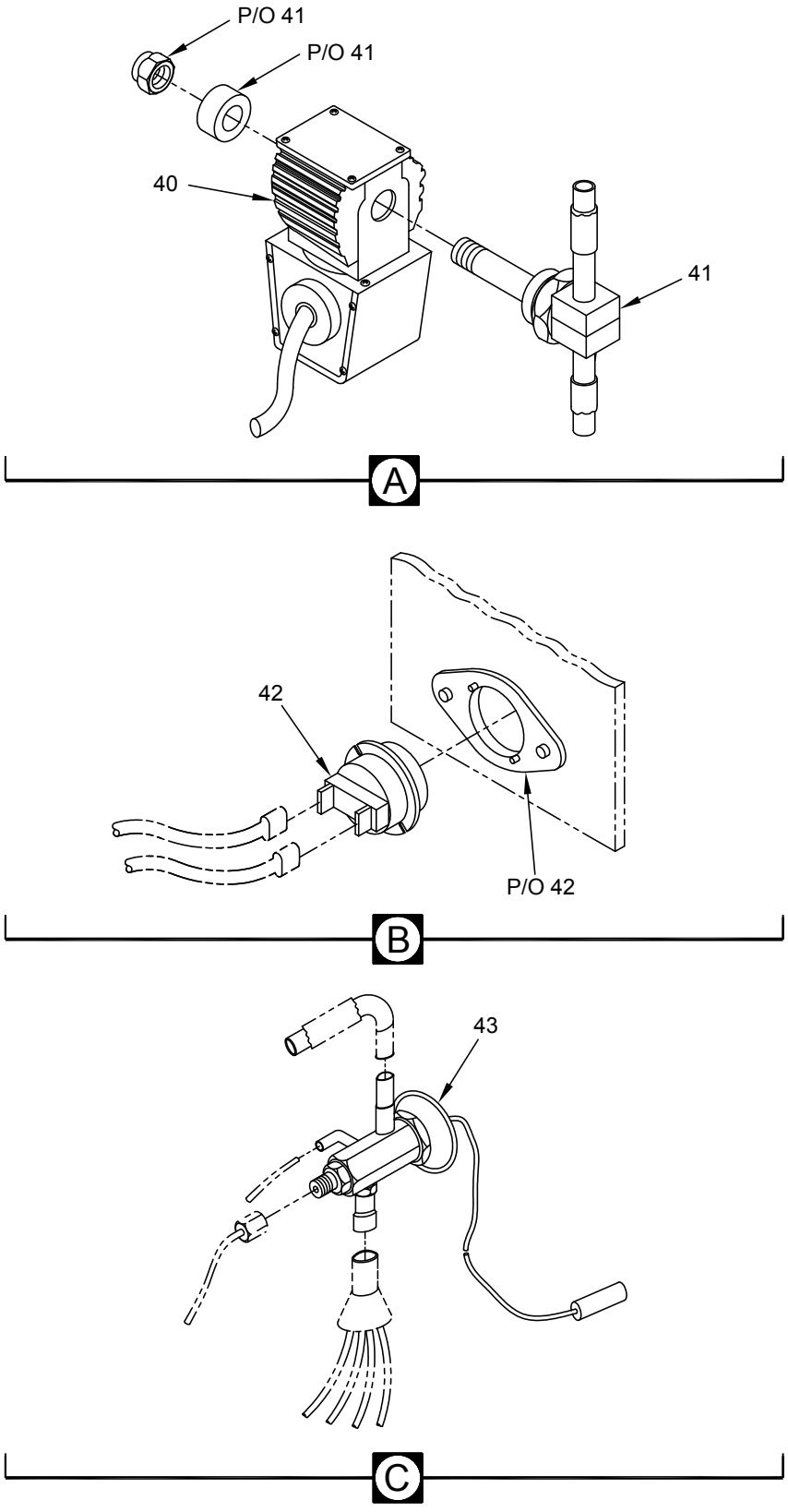


Figure 4. Air Conditioner Enclosure, T250250G/T250250T (Sheet 4 of 5).

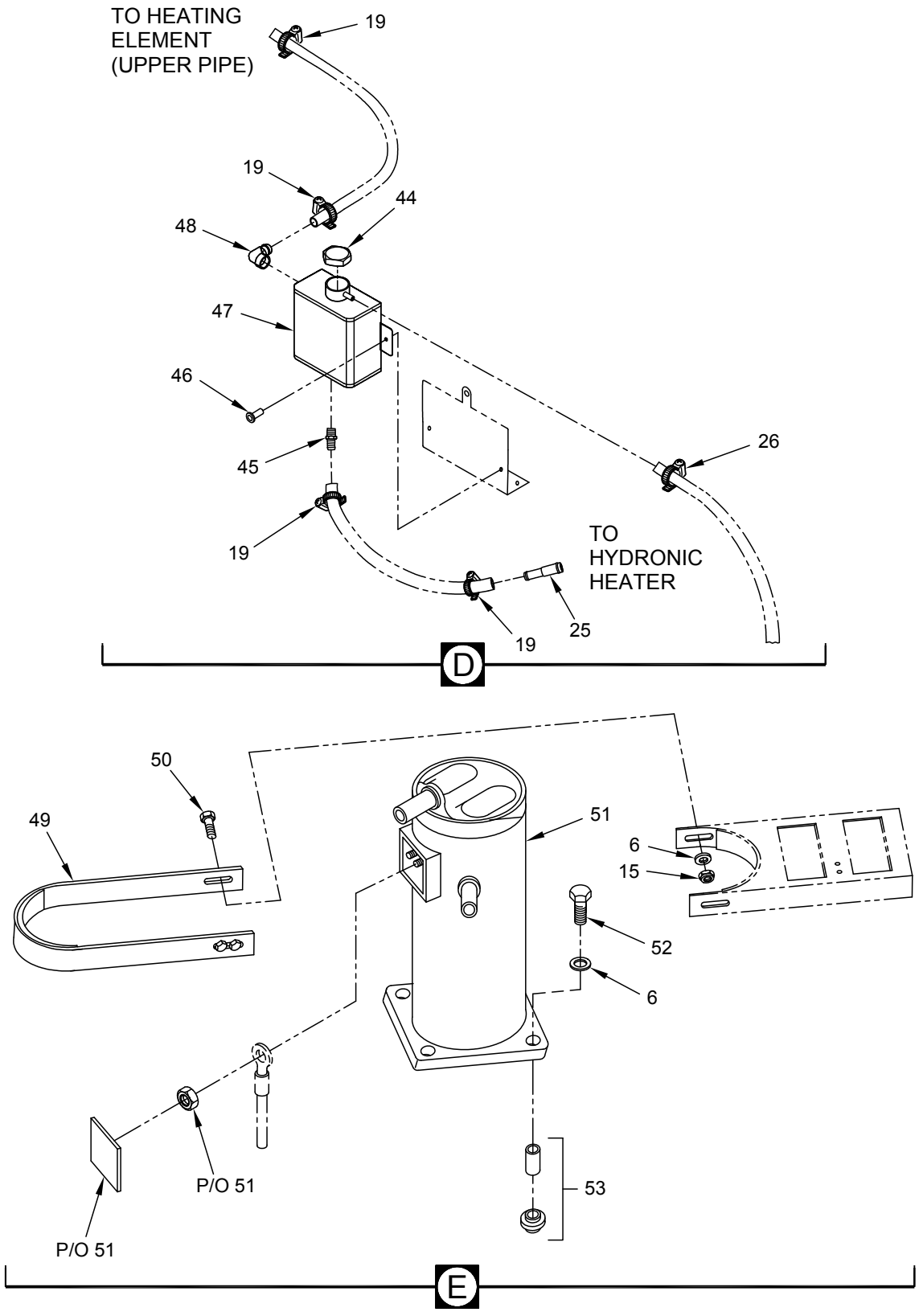


Figure 4. Air Conditioner Enclosure, T250250G/T250250T (Sheet 5 of 5).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010101	
					FIGURE 4 AIR CONDITIONER ENCLOSURE T250250G/T250250T	
1	XBFZZ		0WFM3	1002764	PANEL,ACCESS UOC: 89W	1
1	XBFZZ		0WFM3	1002757	PANEL,ACCESS UOC: 89X	1
2	PAFZZ	5340-01-468-1309	94222	C2-32-35	CATCH,CLAMPING	8
3	XBFZZ		0WFM3	1002765	PANEL,ACCESS UOC: 89W	2
3	XBFZZ		0WFM3	1002758	PANEL,ACCESS UOC: 89X	2
4	PAFZZ		3C0M7	024T115	FILTER ELEMENT, INTAKE,AIR CLEANER	2
5	XBFFF		0WFM3	1002761	PANEL,EVAPORATOR ASSEMBLY (SEE FIGURE 5 FOR BREAKDOWN) UOC: 89W	1
5	XBFFF		0WFM3	1002754	PANEL,EVAPORATOR ASSEMBLY (SEE FIGURE 5 FOR BREAKDOWN) UOC: 89X	1
6	PAFZZ	5310-01-552-2776	1KDE3	25NWFL1	WASHER,FLAT	18
7	PAFZZ	5305-01-552-8706	3C0M7	100T330	SCREW,MACHINE	8
8	PAFZZ	5315-01-552-8316	3C0M7	021T116	PIN,RETAINING	8
9	PAFZZ	5305-00-959-4158	80205	MS24693-C273	SCREW,MACHINE	16
10	XBFZZ		0WFM3	1002763	PANEL,ACCESS UOC: 89W	1
10	XBFZZ		0WFM3	1002756	PANEL,ACCESS UOC: 89X	1
11	XCFDD		0WFM3	TG423-0901	BLOWER ASSEMBLY (SEE FIGURE 7 FOR BREAKDOWN)	1
12	XBFDD		3C0M7	088T103	CONTROL ENCLOSURE,AIR CONDITIONER (SEE FIGURE 6 FOR BREAKDOWN)	1
13	PAFZZ	5340-01-552-0719	94222	62-74-25	CATCH,FLUSH	1
14	XBFZZ		3C0M7	081T102G	GRILL,CONDENSER UOC: 89W	1
14	XBFZZ		3C0M7	081T102T	GRILL,CONDENSER UOC: 89X	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
15	PAFZZ	5310-01-552-3984	1KDE3	25CNNE1	NUT,SELF-LOCKING, HEXAGON	8
16	PAFZZ	5365-01-559-2443	1KDE3	25N62ZR5A	SPACER,PLATE	3
17	PAFZZ	5307-01-558-7259	44MG9	91887A	STUD,SHOULDERED	3
18	PAFZZ	2990-01-552-6325	44MG9	97359A	HEATER,COOLANT,ENGINE	1
19	PAFZZ	4730-01-492-6678	39428	5388K18	CLAMP,HOSE	8
20	PAFZZ	4210-01-568-9442	44MG9	5023298A	HOSE,METALLIC	2
21	PAFZZ	5920-01-123-5212	58536	AA55569/01-005	FUSE,INCLOSED LINK	1
22	PAFZZ	5920-01-149-6952	58536	AA55569/01-008	FUSE,INCLOSED LINK	1
23	PAFZZ	4730-01-552-2772	44MG9	330027	CLAMP,HOSE	8
24	PAFZZ	4720-01-552-9960	44MG9	484032	HOSE,NONMETALLIC	4
25	PAFZZ	4730-01-569-7756	39428	5520K302	REDUCER,PIPE	2
26	PAFZZ	4730-01-556-5477	0Y3H3	62008	CLAMP,HOSE	7
27	PAFZZ	5305-01-552-3987	1KDE3	25C100HCS1	SCREW,CAP,HEXAGON HEAD	1
28	PAFZZ	4730-01-552-6415	44MG9	1310763A	CLAMP,HOSE	1
29	PAFZZ	2910-01-553-0046	44MG9	50487171A	FILTER ELEMENT,FLUID	1
30	XBFZZ		44MG9	50483931A	FUEL LINE,PLASTIC	1
31	PAFZZ	2910-01-553-0047	44MG9	86116A	PUMP,FUEL,ELECTRICAL	1
32	PAFZZ	5340-01-568-7761	3C0M7	063T103	MOUNT RESILIENT,GENERAL PURPOSE	1
33	PAFZZ	5930-01-568-7581	4BDY7	SLP2550	SWITCH,PRESSURE	1
34	PAFZZ		0LCG1	29PSL020-33-500	SWITCH,PRESSURE	1
35	PAFZZ	5340-01-569-2970	3C0M7	063T105	MOUNT,RESILIENT,GENERAL PURPOSE	1
36	PAFZZ	4130-00-903-8372	70255	EK-165S	FILTER-DRIER, REFRIGERANT	1
37	PAFZZ	4820-01-333-6042	21013	RV5100025C	VALVE,SAFETY RELIEF	1
38	PAFZZ	3835-01-568-7074	78462	EFVE-1-L1	VALVE SECTION,PIPELINE	1
39	PAFZZ	4820-01-165-7825	78462	ADRSE-2-0/80-3/8ODF	VALVE,EXPANSION	1
40	PAFZZ	9999-01-568-8609	3C0M7	053T102	COIL,SOLENOID	1
41	PAFZZ	4810-01-568-7071	78462	OE10S240	VALVE,SOLENOID	1
42	PAFZZ	5930-01-568-9799	0WFM3	1000947	SWITCH,PUSH	1
43	PAFZZ	4830-01-568-7079	78462	EFVE-5-CP100	VALVE,EXPANSION	1
44	PAFZZ	2930-01-569-1146	0WFM3	1000905	CAP,FILLER OPENING	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
45	PAFZZ	4730-01-539-9942	39428	5346K66	ADAPTER,STRAIGHT,PIPE TO HOSE	1
46	PAFZZ	5320-01-568-6990	39428	97447A220	RIVET,BLIND	2
47	XBFZZ		3C0M7	006T102	TANK,COOLANT,DIESEL	1
48	PAFZZ	4730-01-569-1177	39428	53525K22	ELBOW,TUBE TO BOSS	1
49	XBFZZ		3C0M7	60-B-176	PLATE,COMPRESSOR MOUNTING	1
50	PAFZZ	5305-01-529-4402	2V507	92865A540	SCREW,CAP,HEXAGON HEAD	8
51	PAFDD		70255	ZR72KCE-TF5-250	COMPRESSOR UNIT,REFRIGERATION	1
52	PAFZZ	5305-01-569-1152	39428	91247A548	SCREW,CAP,HEXAGON HEAD	4
53	PAFZZ	5340-01-520-7456	14569	527-0116-00	BUMPER	1
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PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
PANEL, EVAPORATOR ASSEMBLY, 1002761, 1002754

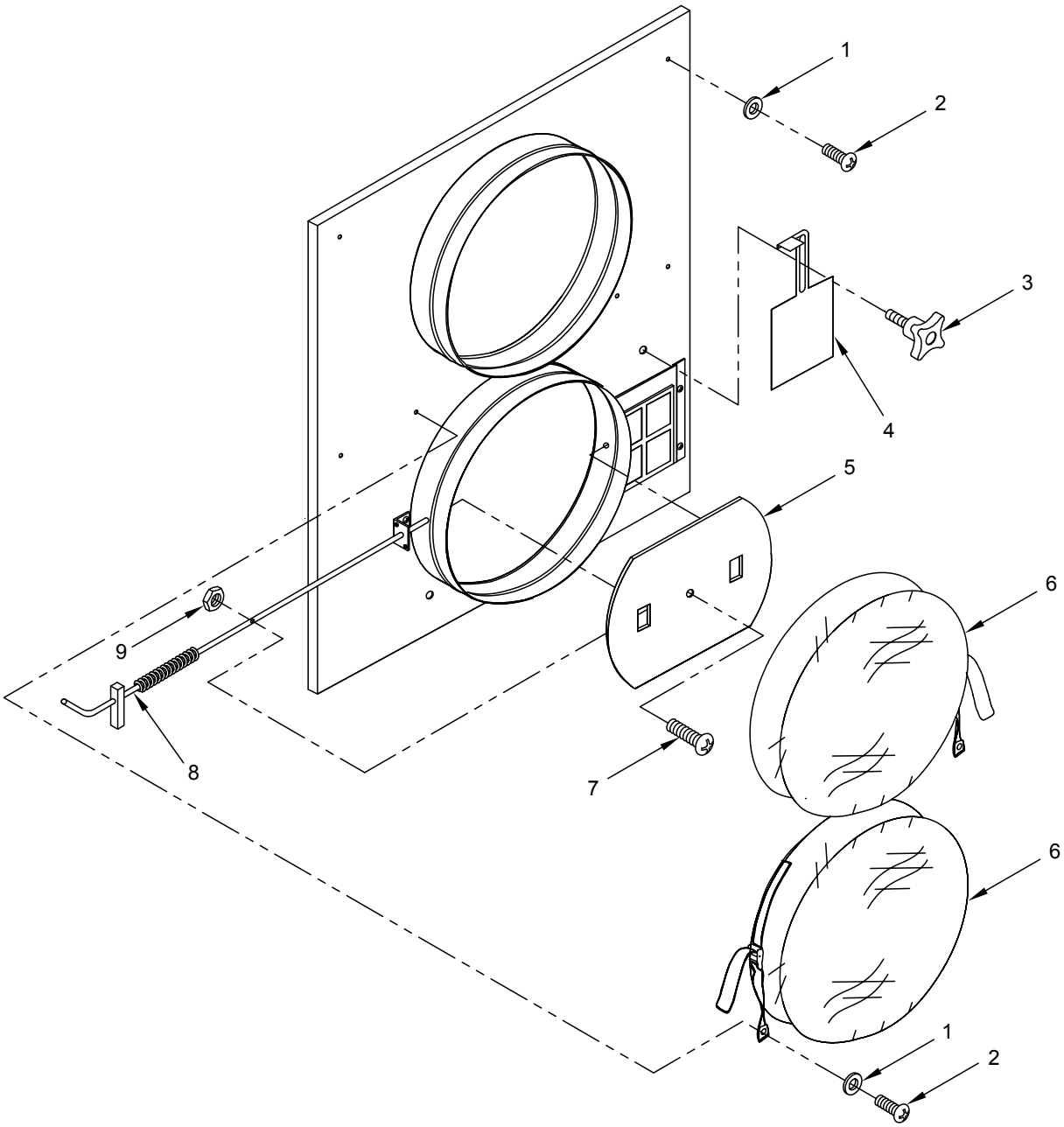
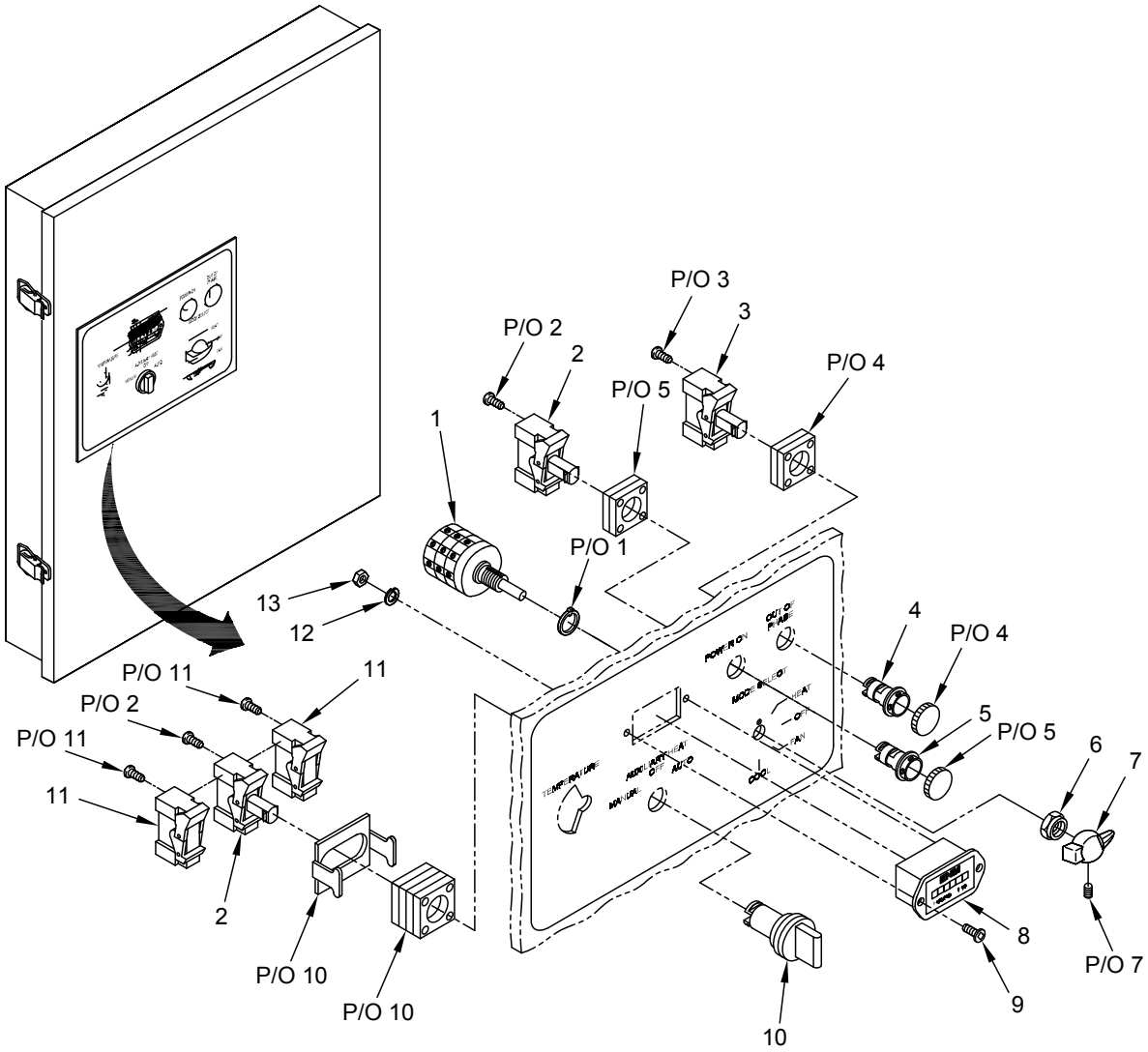


Figure 5. Panel, Evaporator Assembly, 1002761, 1002754.

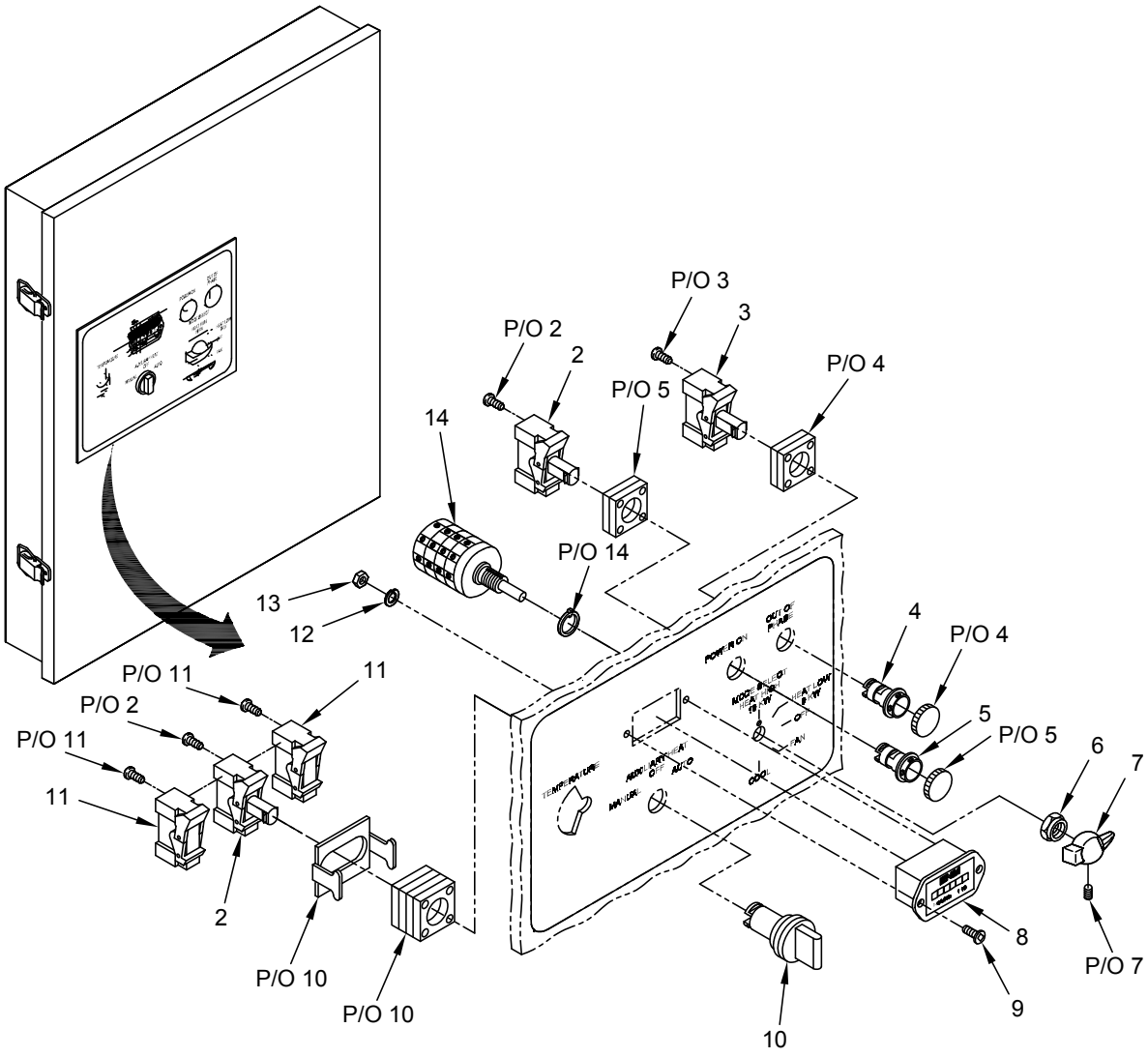
(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 01010101	
					FIGURE 5 PANEL, EVAPORATOR ASSEMBLY 1002761, 1002754	
1	PAFZZ	5310-01-552-2776	1KDE3	25NWFL1	WASHER,FLAT	6
2	PAFZZ	5305-01-552-8706	3C0M7	100T330	SCREW,MACHINE	6
3	PAFZZ	5355-01-552-3328	39428	7921K216	KNOB	1
4	XBFZZ		0WFM3	TG423-0451-2G	DOOR,SLIDING UOC: 89W	1
4	XBFZZ		0WFM3	1006024	DOOR,SLIDING UOC: 89X	1
5	XBFZZ		0WFM3	TG423-0501-1G	PLATE,DAMPER UOC: 89W	1
5	XBFZZ		0WFM3	1006026	PLATE,DAMPER UOC: 89X	1
6	PAFZZ	5340-01-552-7835	0WFM3	T295161G	COVER,PROTECTIVE,DUST AND MOISTURE SEAL UOC: 89W	2
6	PAFZZ	5340-01-558-6141	0WFM3	T295161T	COVER,PROTECTIVE,DUST AND MOISTURE SEAL UOC: 89X	2
7	PAFZZ	5305-01-568-3945	5N835	1166-278	SCREW,MACHINE	1
8	XBFZZ		0WFM3	TG423-0551-1G	ROD,DAMPER UOC: 89W	1
8	XBFZZ		0WFM3	1006025	ROD,DAMPER UOC: 89X	1
9	PAFZZ	5310-01-479-5890	0Y3H3	70862	NUT,SELF-LOCKING, HEXAGON	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
CONTROL, ENCLOSURE, AIR CONDITIONER, 088T103



VERSION 1

Figure 6. Control, Enclosure, Air Conditioner, 088T103 (Sheet 1 of 11).



VERSION 2

Figure 6. Control, Enclosure, Air Conditioner, 088T103 (Sheet 2 of 11).

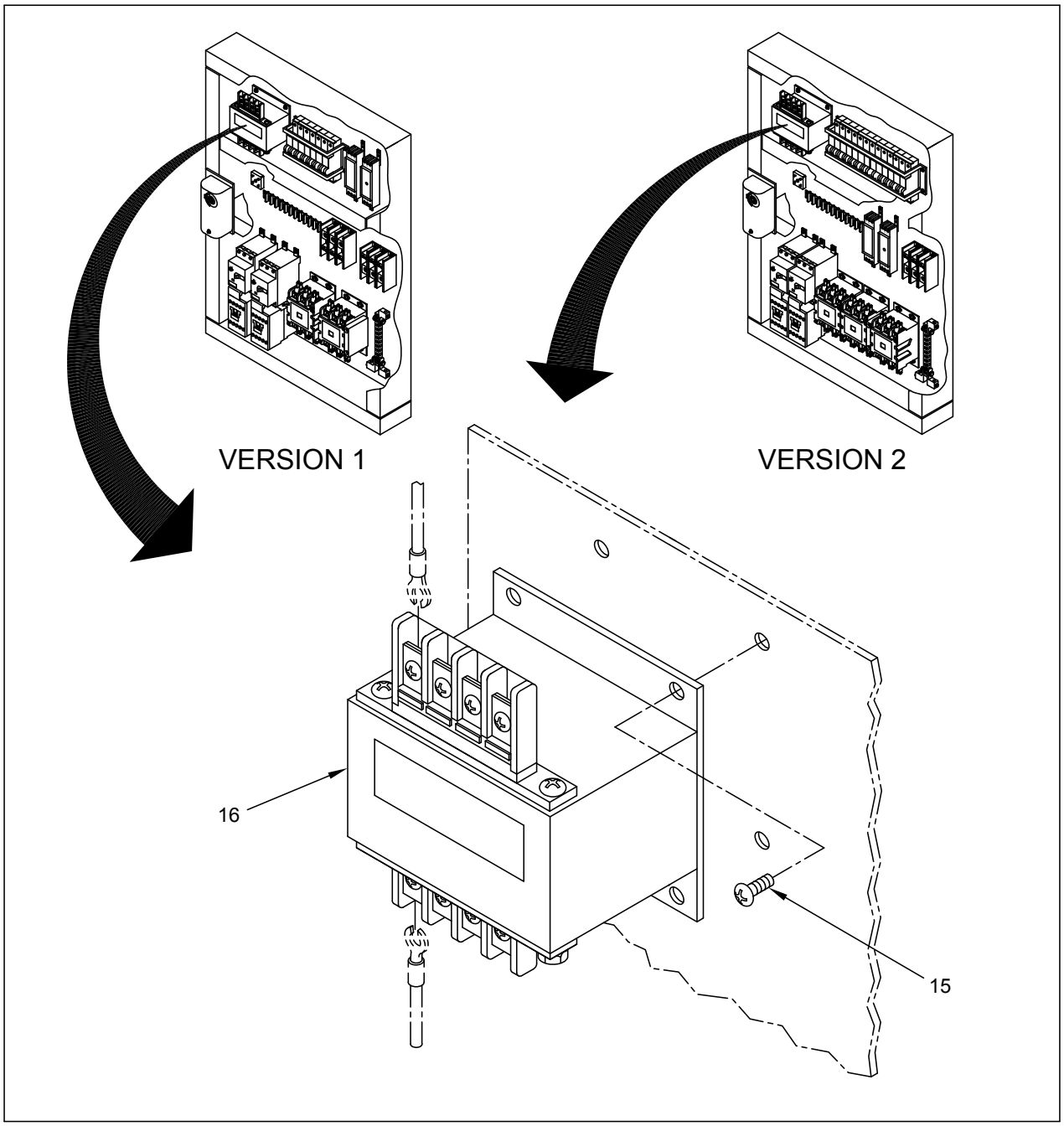


Figure 6. Control, Enclosure, Air Conditioner, 088T103 (Sheet 3 of 11).

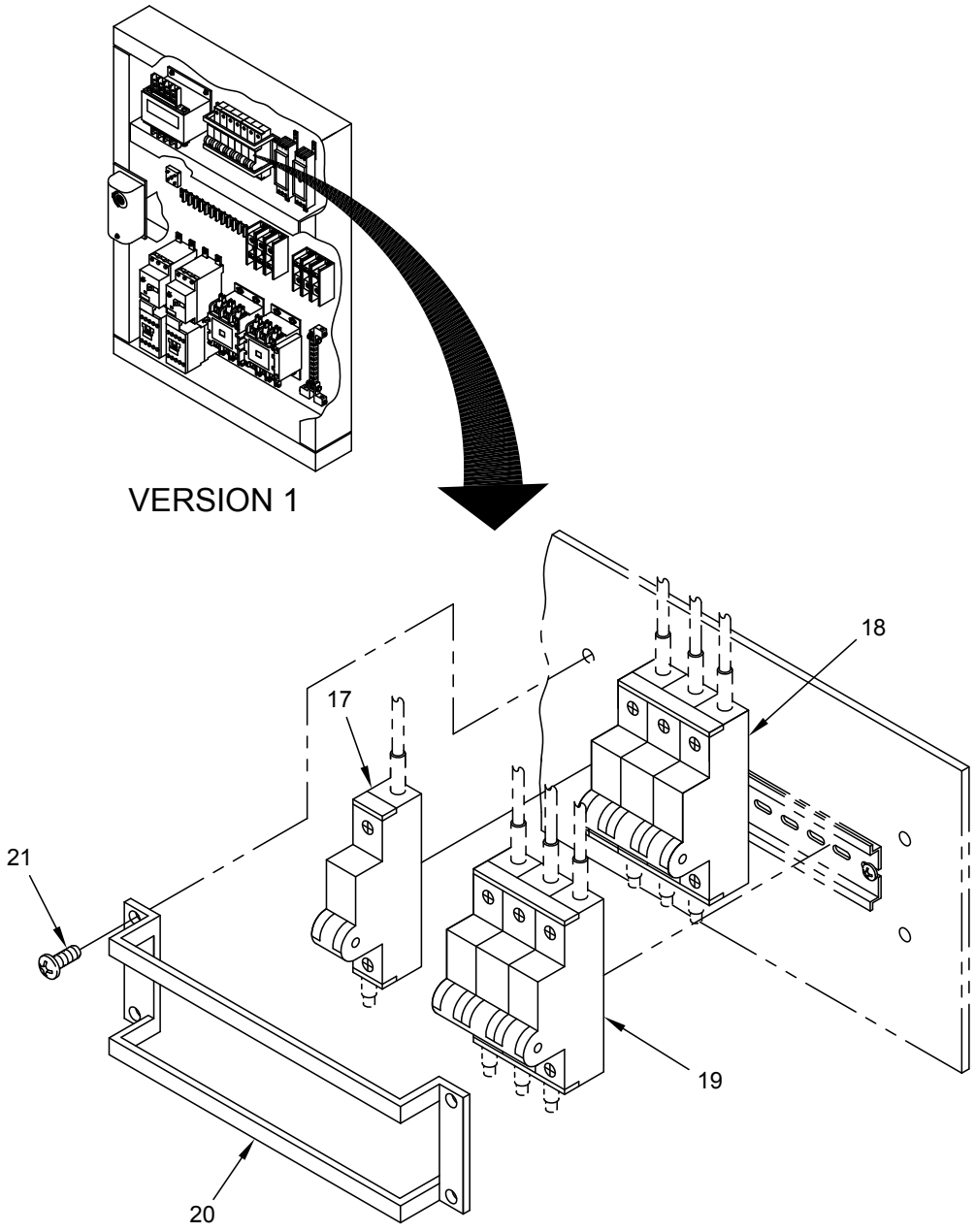


Figure 6. Control, Enclosure, Air Conditioner, 088T103 (Sheet 4 of 11).

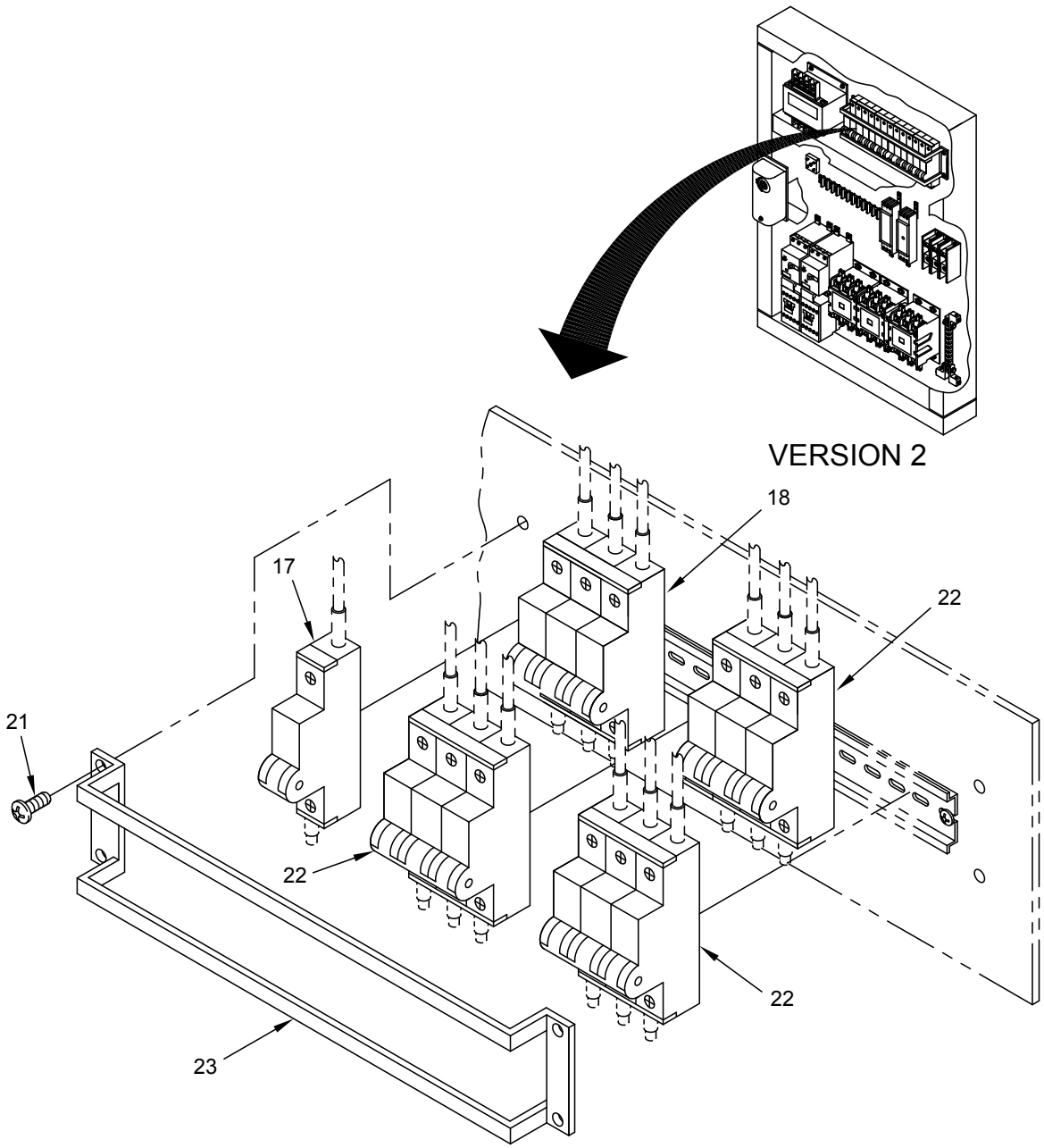


Figure 6. Control, Enclosure, Air Conditioner, 088T103 (Sheet 5 of 11).

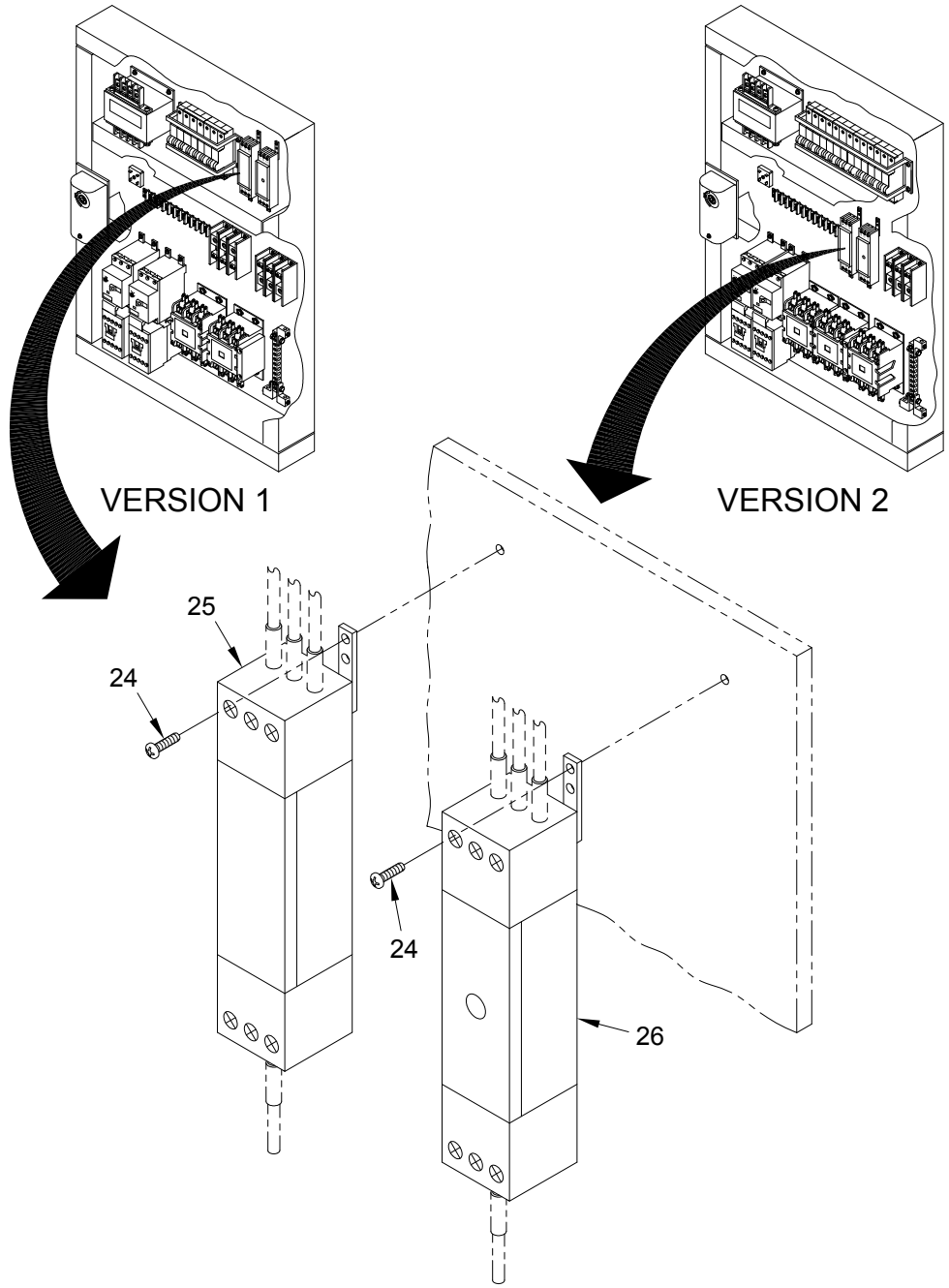


Figure 6. Control, Enclosure, Air Conditioner, 088T103 (Sheet 6 of 11).

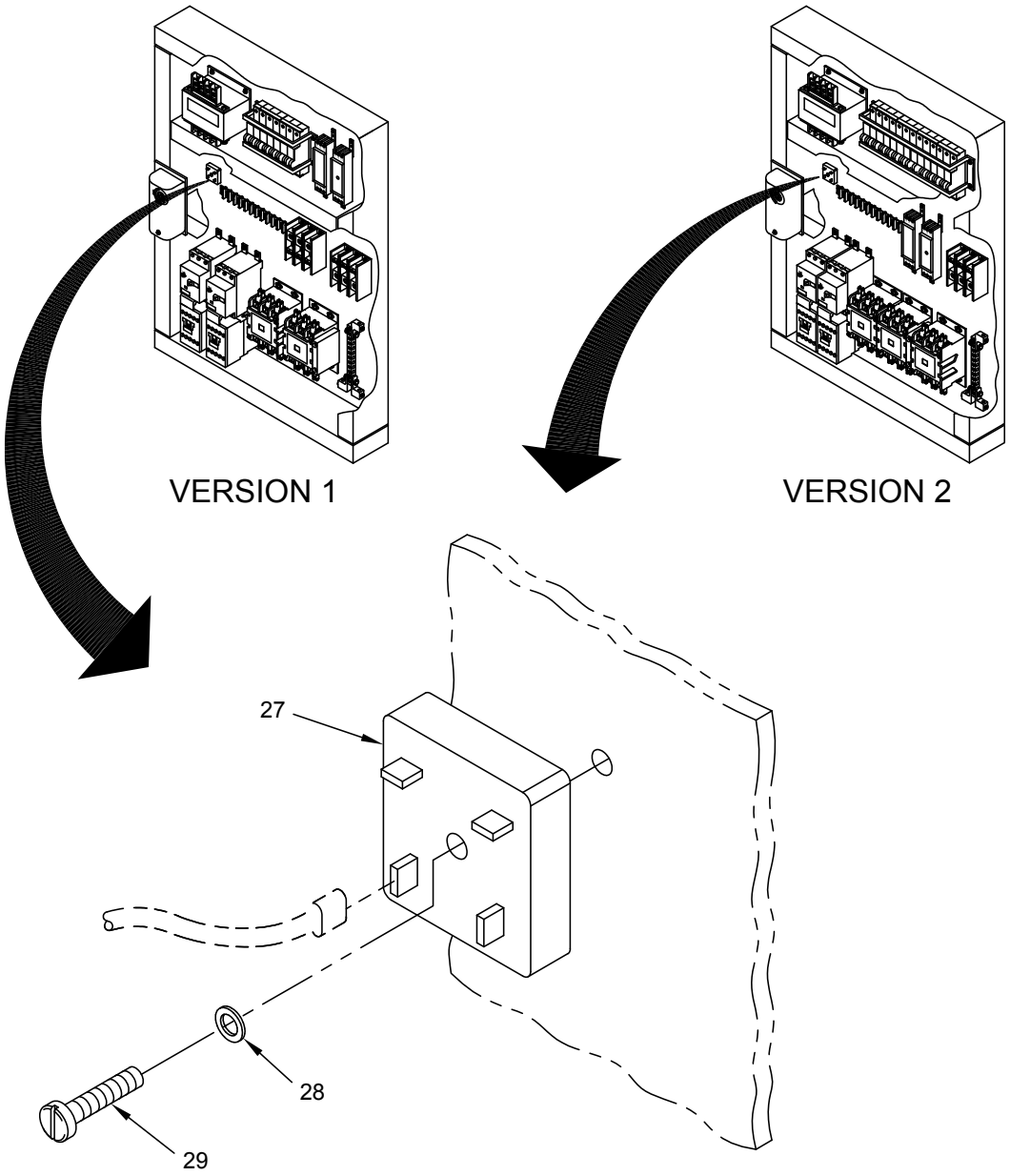


Figure 6. Control, Enclosure, Air Conditioner, 088T103 (Sheet 7 of 11).

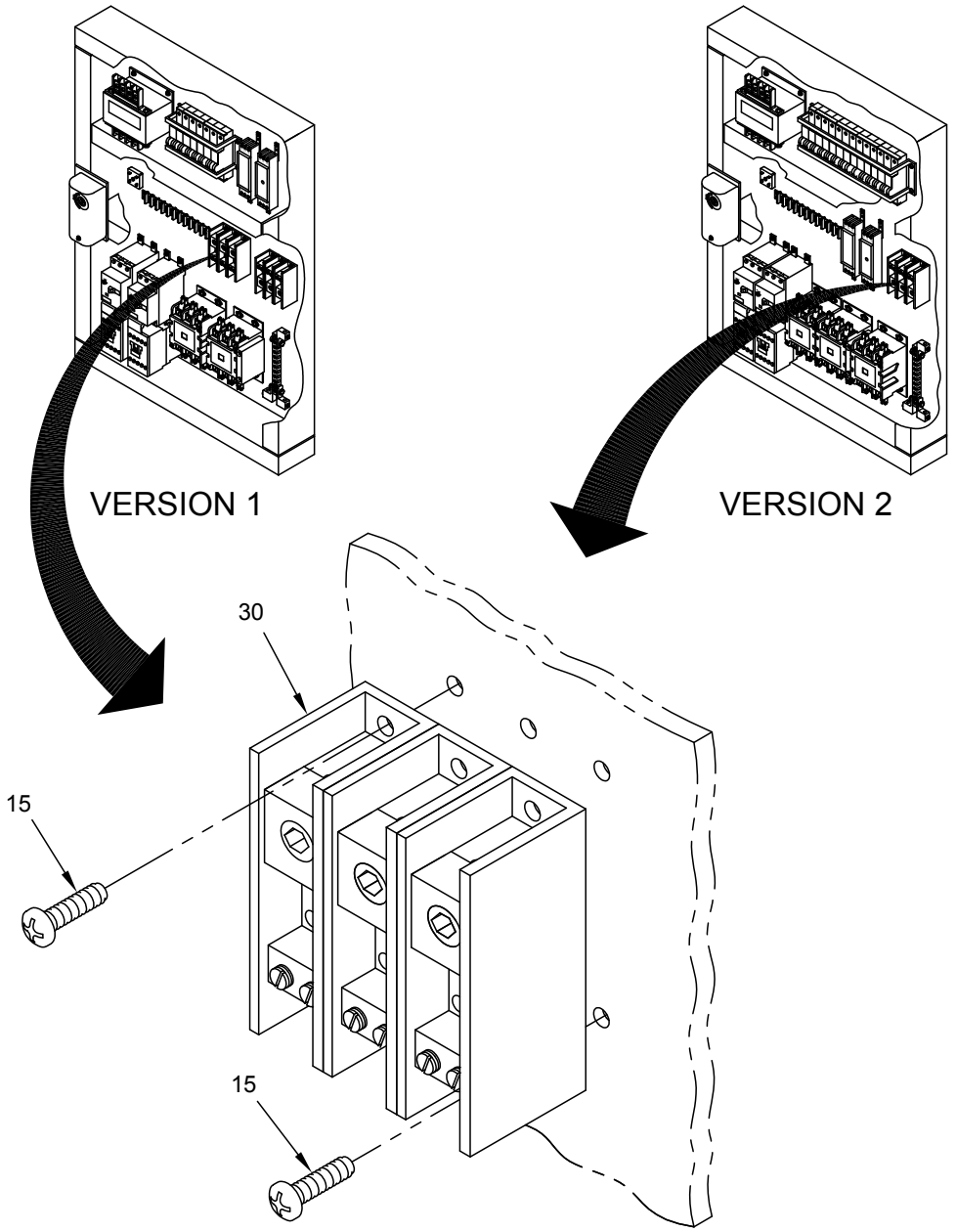


Figure 6. Control, Enclosure, Air Conditioner, 088T103 (Sheet 8 of 11).

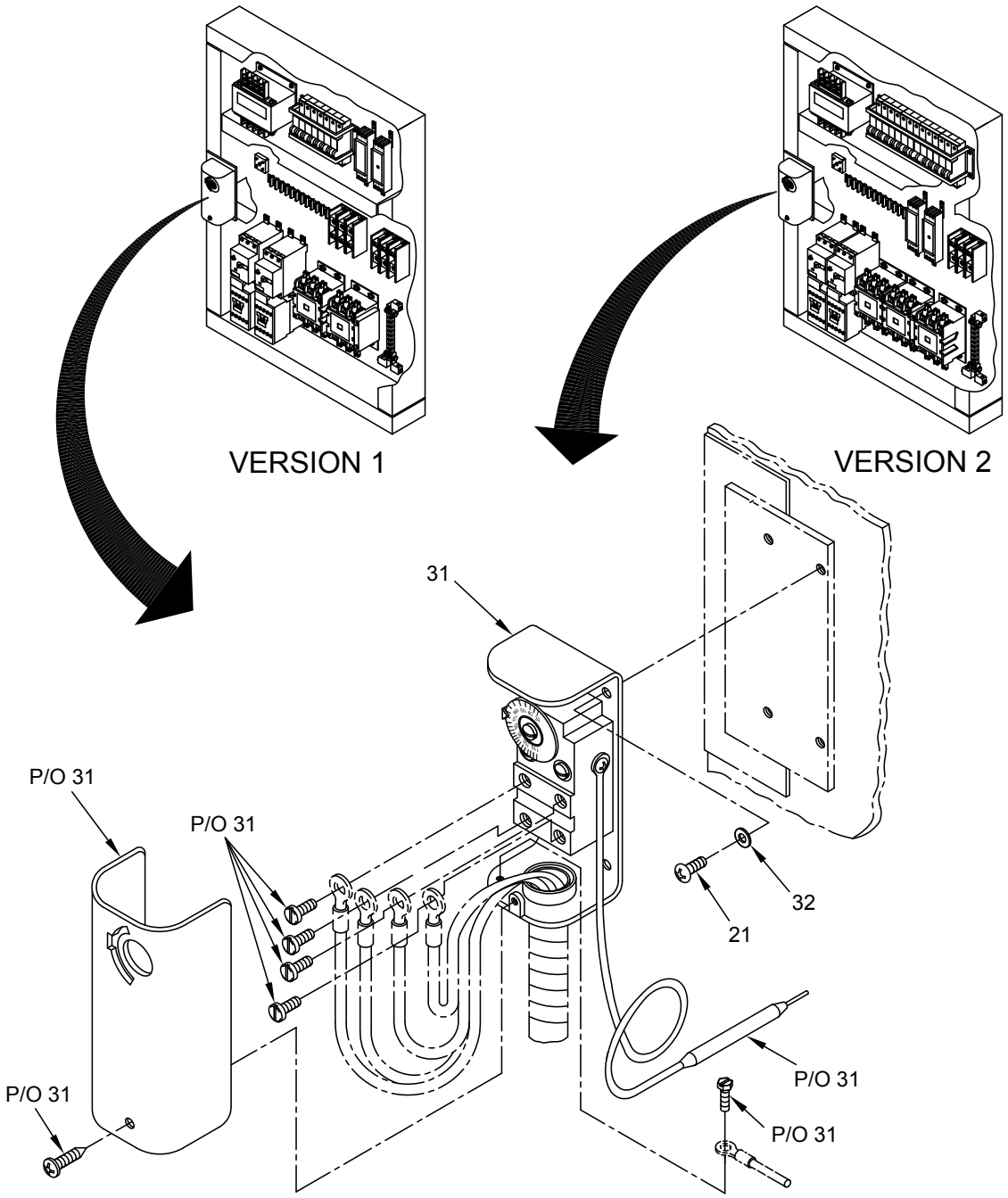


Figure 6. Control, Enclosure, Air Conditioner, 088T103 (Sheet 9 of 11).

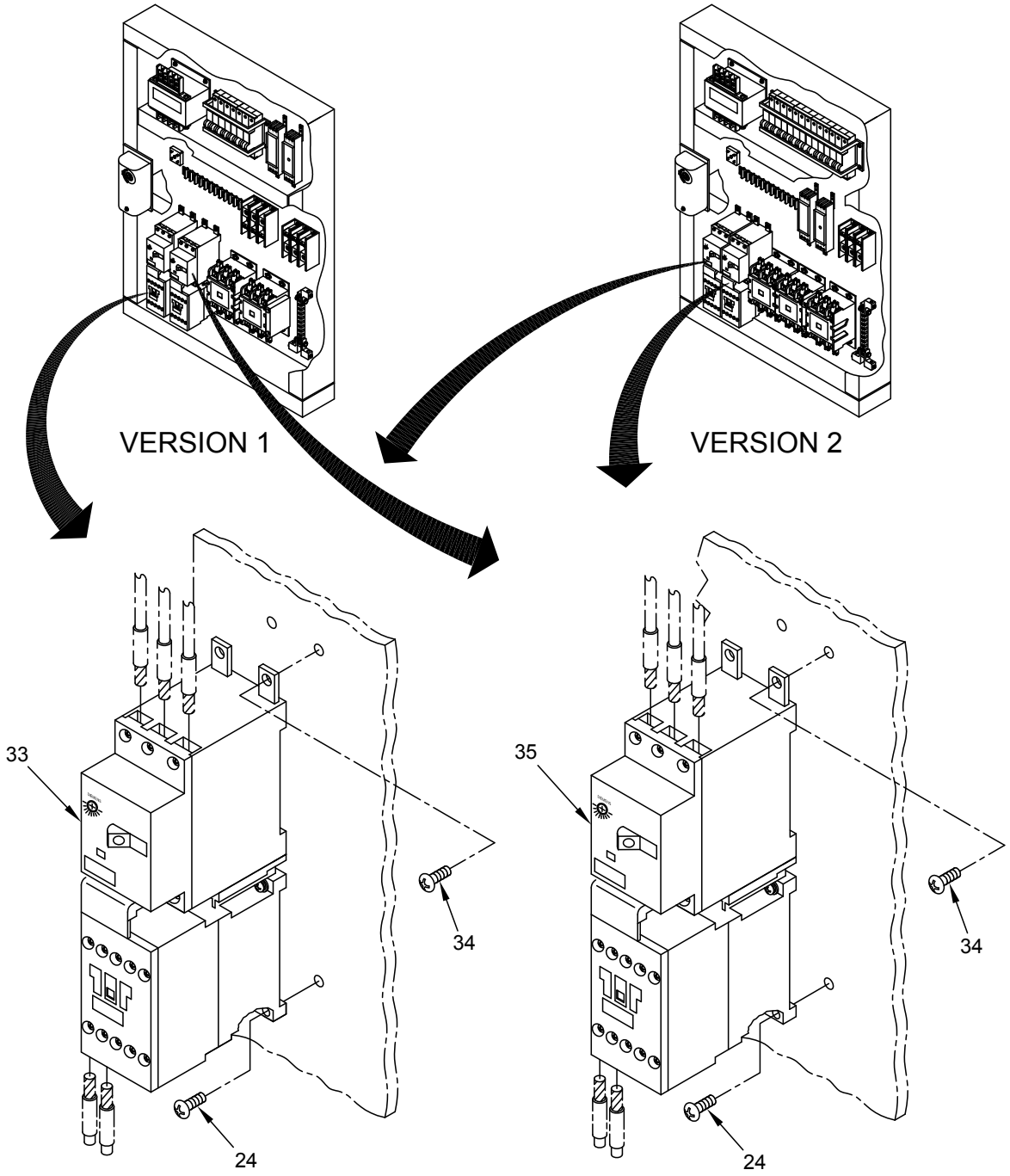


Figure 6. Control, Enclosure, Air Conditioner, 088T103 (Sheet 10 of 11).

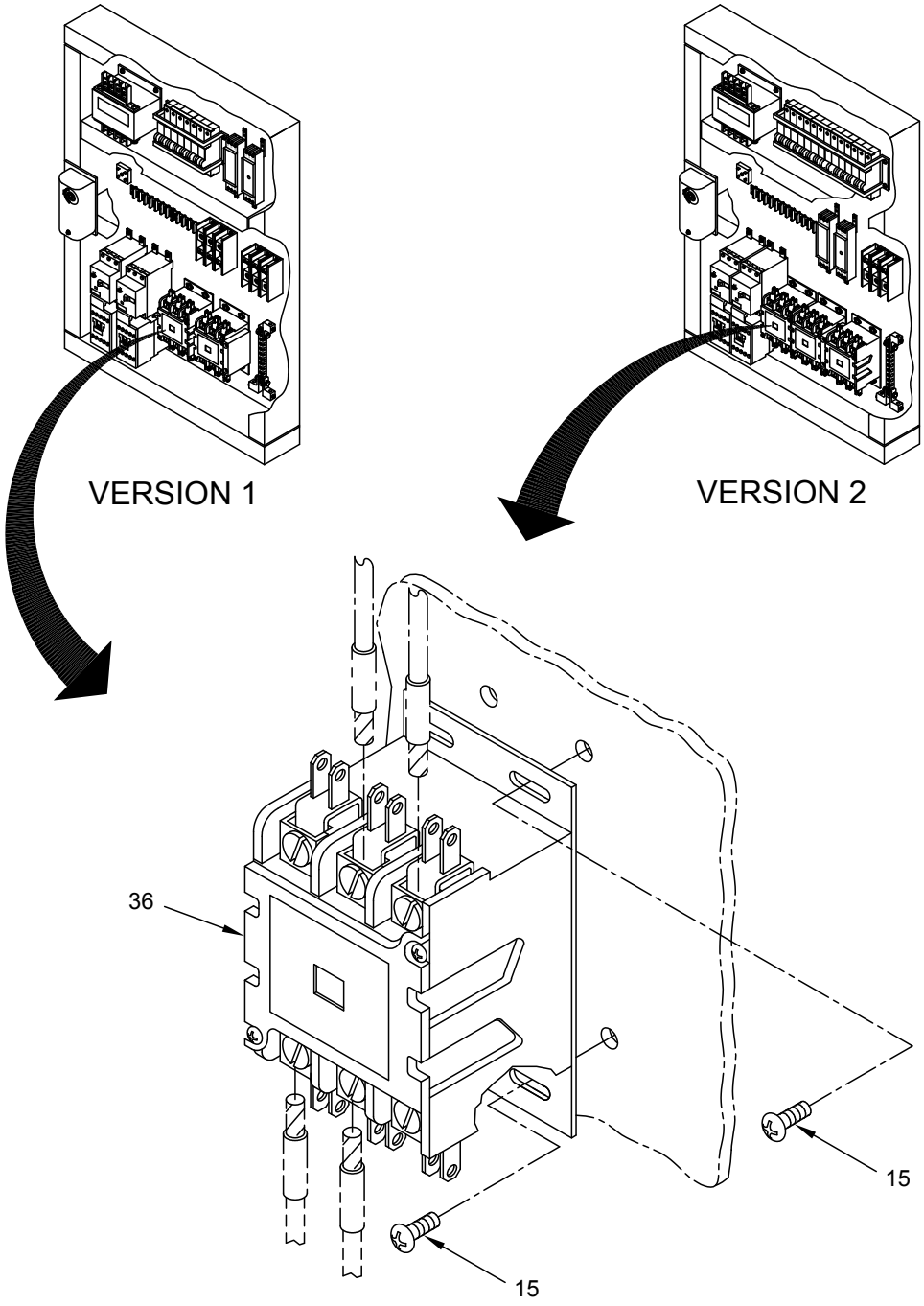


Figure 6. Control, Enclosure, Air Conditioner, 088T103 (Sheet 11 of 11).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 01010102	
					FIGURE 6 CONTROL, ENCLOSURE, AIR CONDITIONER 088T103	
1	PAFZZ	5930-00-832-5174	97403	13211E6931	SWITCH,ROTARY	1
2	PAFZZ	6250-01-568-1030	08VG8	3SB3400-1PC	LAMPHOLDER	2
3	PAFZZ	6250-01-568-0001	08VG8	3SB3400-1PB	LAMPHOLDER	1
4	PAFZZ	6210-01-552-1332	82121	3SB3001-6BA20	INDICATOR,LIGHT	1
5	PAFZZ	6210-01-552-1327	82121	3SB3001-6BA40	INDICATOR,LIGHT	1
6	PAFZZ	5930-00-496-7492	81349	M5423/09-04	BOOT,DUST AND MOISTURE	1
7	PAFZZ	5355-01-552-8299	82121	088T101-32	KNOB	1
8	PAFZZ	6645-01-567-8282	56252	T51E430	METER,TIME TOTALIZING	1
9	PAFZZ	5305-01-138-6292	39428	91772A110	SCREW,MACHINE	2
10	PAFZZ	5355-01-568-3921	08VG8	3SB3001-2DA41	KNOB	1
11	PAFZZ	5999-01-568-1074	08VG8	1000861	CONTACT,ELECTRICAL	2
12	PAFZZ	5310-01-568-0727	39428	92146A530	WASHER,LOCK	2
13	PAFZZ	5310-00-934-9748	80205	MS35649-244	NUT,PLAIN,HEXAGON	2
14	PAFZZ	5930-00-556-9791	96906	MS25002-4	SWITCH,ROTARY	1
15	PAFZZ	5305-01-568-1062	1KDE3	10F37MXP1	SCREW,MACHINE	28
16	PAFZZ	5950-01-412-4121	56365	9070T250D14	TRANSFORMER,POWER	1
17	PAFZZ	5925-01-568-0000	08VG8	5SY4106-7	CIRCUIT BREAKER	1
18	PAFZZ	5925-01-568-1099	08VG8	5SY4315-8	CIRCUIT BREAKER	1
19	PAFZZ	5925-01-567-9995	08VG8	5SY4363-8	CIRCUIT BREAKER	1
20	XBFZZ		3C0M7	035T112	BRACKET,MOUNTING	1
21	PAFZZ	5305-01-446-0679	39428	91772A144	SCREW,MACHINE	12
22	PAFZZ	5925-01-567-9997	08VG8	5SY4332-8	CIRCUIT BREAKER	3
23	XBFZZ		3C0M7	035T113	BRACKET,MOUNTING	1
24	PAFZZ	5305-01-568-4710	0WFM3	T270130	SCREW,MACHINE	8
25	PAFZZ	5895-01-569-2953	3C0M7	089T108	MONITOR,PHASE	1
26	PAFZZ	5945-01-568-7389	08VG8	3RP1512-1AQ30	RELAY,SOLID STATE	1
27	PAFZZ	5961-01-148-3364	26916	KBPC3501	RECTIFIER,SEMICONDUCTOR DEVICE	1
28	PAFZZ	5310-01-553-0370	1KDE3	8NWFL1	WASHER,FLAT	1
29	PAFZZ	5305-01-568-9503	39428	91249A196	SCREW,MACHINE	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
30	PAFZZ	5940-01-568-7575	26405	1323580	CONTACT ASSEMBLY, ELECTRICAL	2
31	PAFZZ	5930-01-568-7446	06541	A28AA-28C	SWITCH,THERMOSTATIC	1
32	PAFZZ	5310-01-552-7435	39428	92141A006	WASHER,FLAT	4
33	PAFZZ	5999-01-568-7586	0WFM3	1000902	CONTACT ASSEMBLY, ELECTRICAL	1
34	PAFZZ	5305-00-054-6668	96906	MS51957-43	SCREW,MACHINE	4
35	PAFZZ	5999-01-569-5921	0WFM3	PECU05T23B	CONTACT ASSEMBLY, ELECTRICAL	1
36	PAFZZ	5945-00-778-3922	23826	41EB30AJ	RELAY,ELECTROMAGNETIC	3
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
BLOWER ASSEMBLY, 054T102

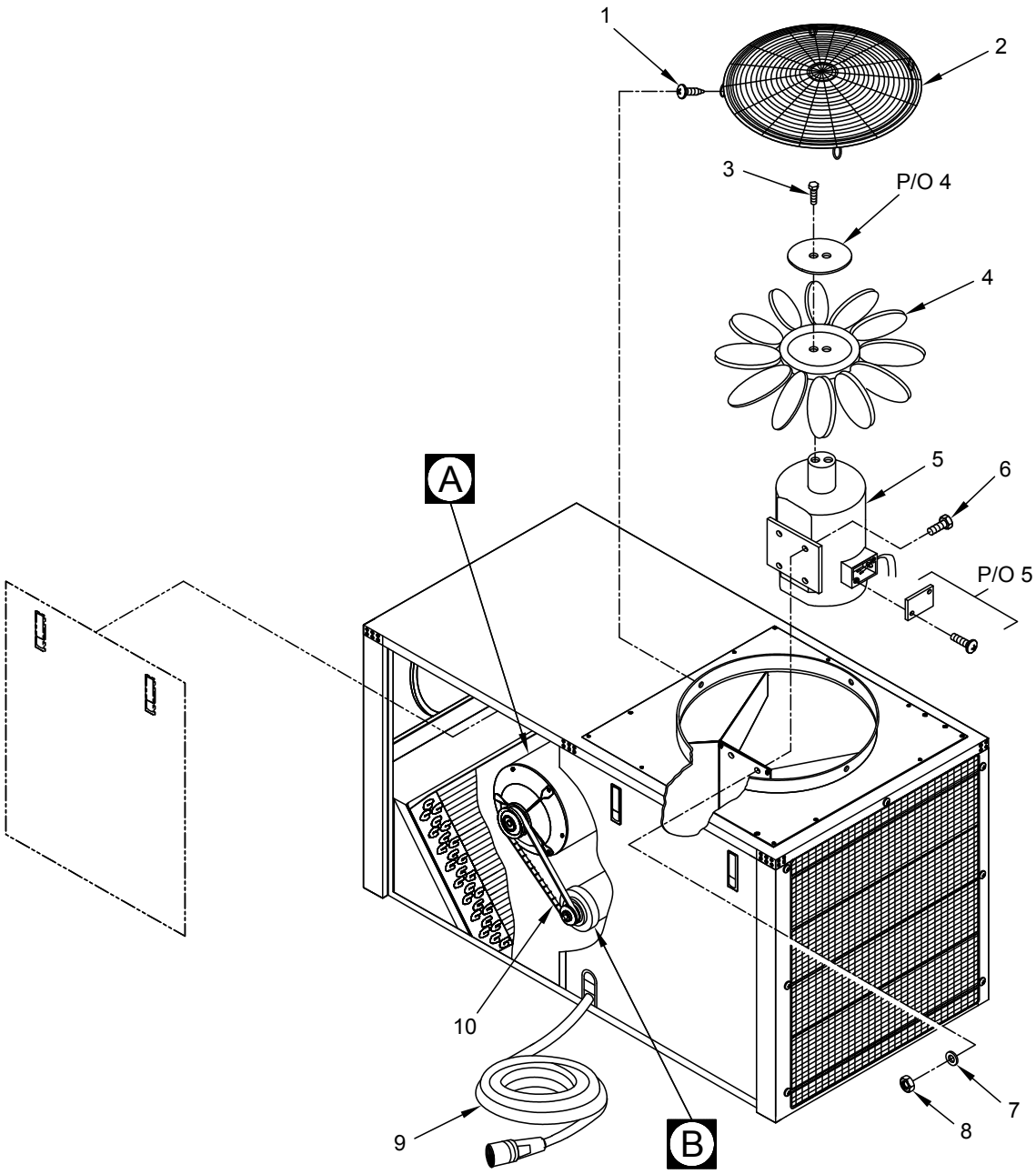


Figure 7. Blower Assembly, 054T102 (Sheet 1 of 2).

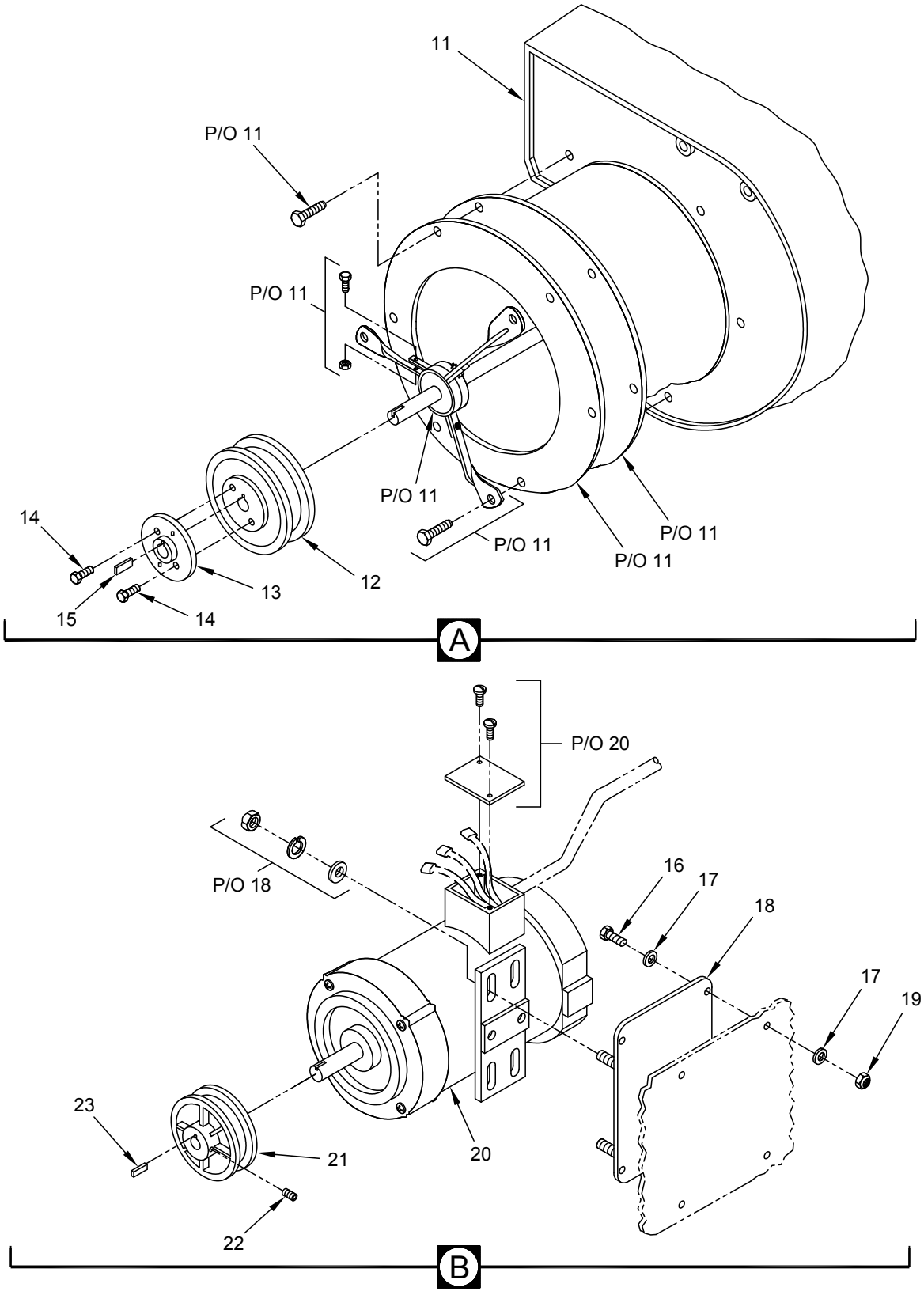


Figure 7. Blower Assembly, 054T102 (Sheet 2 of 2).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 01010103	
					FIGURE 7 BLOWER ASSEMBLY 054T102	
1	PAFZZ	5305-01-564-6941	0Y3H3	28957	SCREW,TAPPING	4
2	XBFZZ		3C0M7	081T106	GUARD,FAN IMPELLER	1
3	PAFZZ	5305-01-568-9387	3C0M7	31C125HCS1/FT	SCREW,CAP,HEXAGON HEAD	2
4	XBFZZ		3C0M7	054T109	IMPELLER,FAN,AXIAL	1
5	PAFZZ	6105-01-568-7464	3C0M7	013T112	MOTOR,ALTERNATING CURRENT	1
6	PAFZZ	5306-01-558-7187	1KDE3	50C150HCS1	BOLT,MACHINE	4
7	PAFZZ	5310-01-558-7720	1KDE3	50NWFL1	WASHER,FLAT	4
8	PAFZZ	5310-01-559-2446	1KDE3	50CNNE1	NUT,SELF-LOCKING, HEXAGON	4
9	PAFZZ		0WFM3	1009749	CABLE ASSEMBLY,POWER, ELECTRICAL	1
10	PAFZZ	3030-00-869-3419	20796	AX38	BELT,V	1
11	PAFZZ	4140-01-569-1023	3C0M7	054T102	IMPELLER,FAN,CENTRIFUGAL	1
12	XBFZZ	3020-01-099-6277	71176	AK54H	PULLEY,GROOVE	1
13	XBFZZ		71176	H25MM	PULLEY,GROOVE	1
14	PAFZZ	5305-01-553-0350	1KDE3	25C75HCS1W	SCREW,CAP,HEXAGON HEAD	2
15	PAFZZ	5315-01-308-1154	39428	98493A117	KEY,MACHINE	1
16	PAFZZ	5306-01-552-9111	3C0M7	100T339	BOLT,MACHINE	4
17	PAFZZ	5310-01-522-8619	3C0M7	100T503	WASHER,FLAT	8
18	XBFZZ		3C0M7	017T101	BRACKET,MOUNTING	1
19	PAFZZ	5310-01-479-5890	0Y3H3	70862	NUT,SELF-LOCKING, HEXAGON	4
20	PAFZZ	6105-01-553-1609	0WFM3	TG903-5001	MOTOR,ALTERNATING CURRENT	1
21	XBFZZ		71176	BK45X5/8	PULLEY,GROOVE	1
22	PAFZZ	5305-01-569-6914	39428	92311A578	SETSCREW	1
23	PAFZZ	5315-01-569-3362	39428	98493A137	KEY,MACHINE	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
GENERATOR, DIESEL ENGINE, T282271G/T282271T

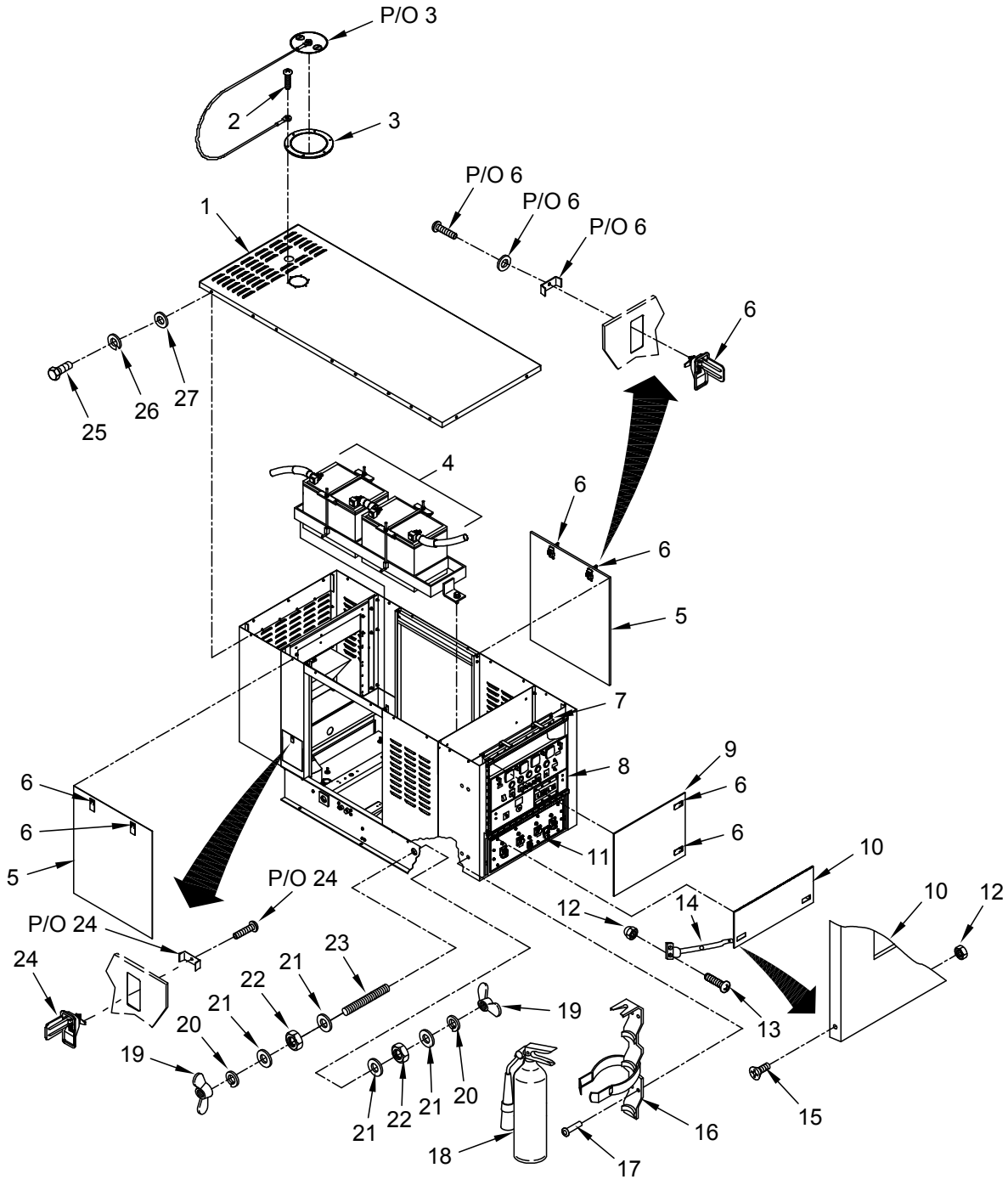


Figure 8. Generator, Diesel Engine, T282271G/T282271T (Sheet 1 of 10).

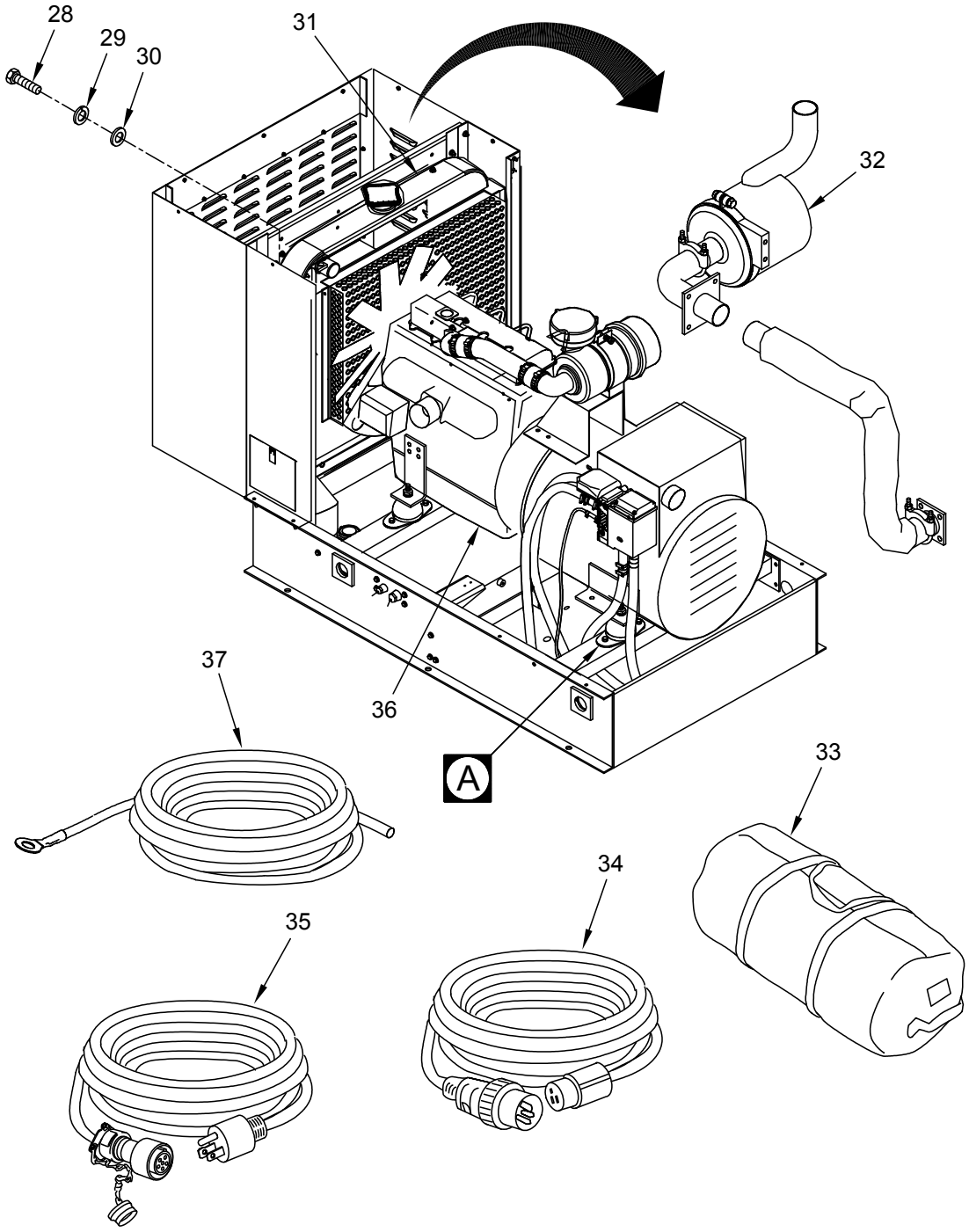


Figure 8. Generator, Diesel Engine, T282271G/T282271T (Sheet 2 of 10).

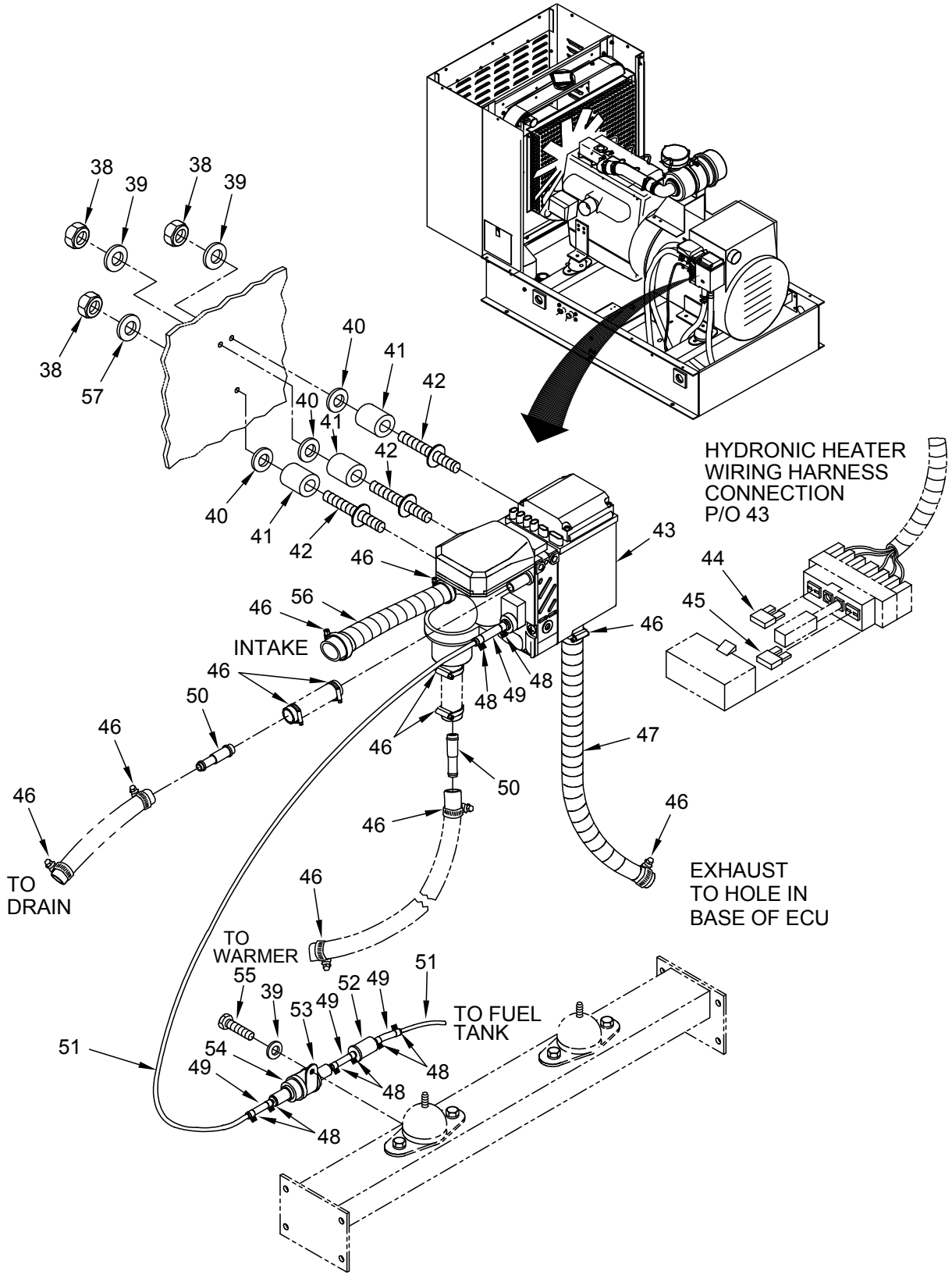


Figure 8. Generator, Diesel Engine, T282271G/T282271T (Sheet 3 of 10).

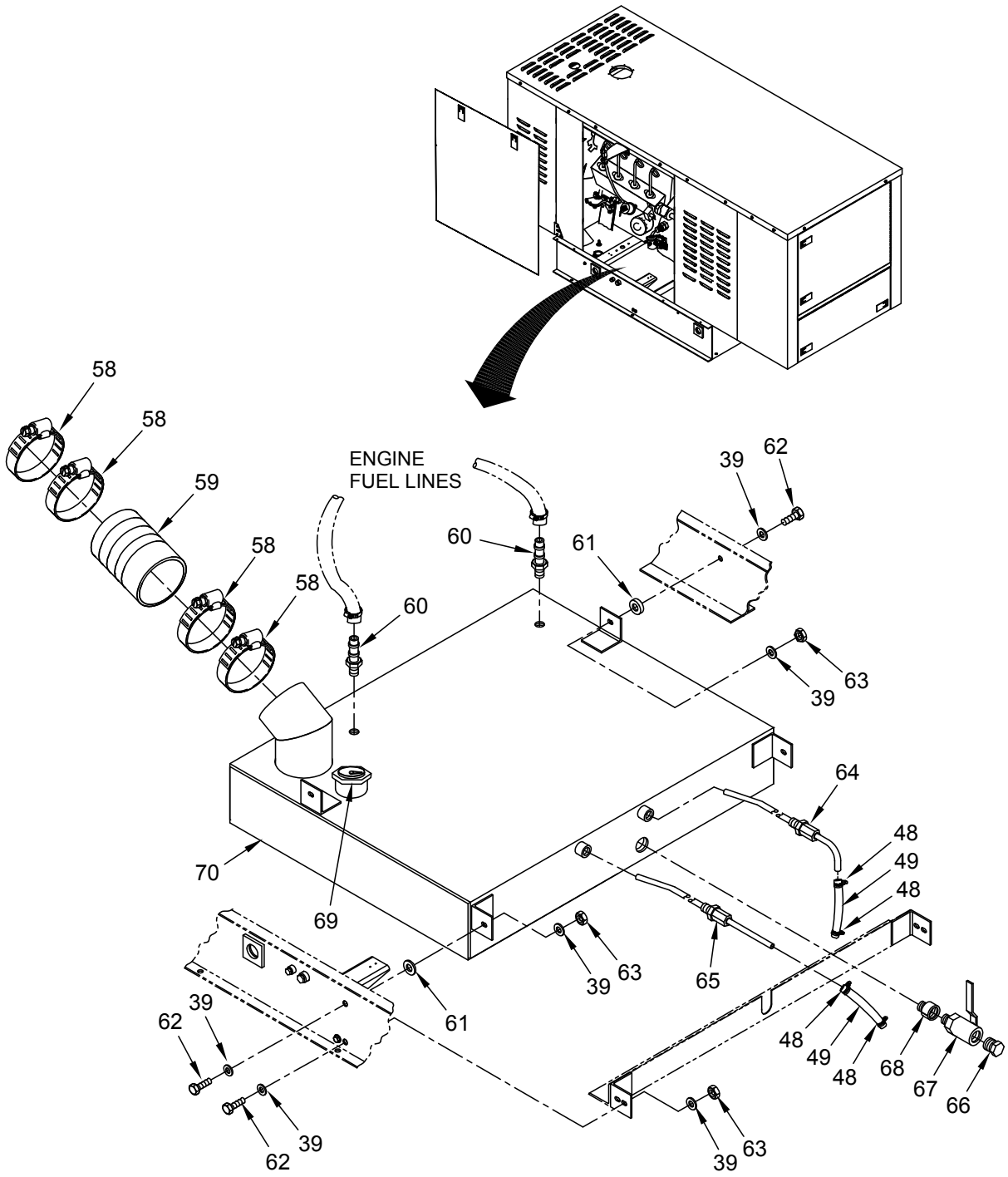


Figure 8. Generator, Diesel Engine, T282271G/T282271T (Sheet 4 of 10).

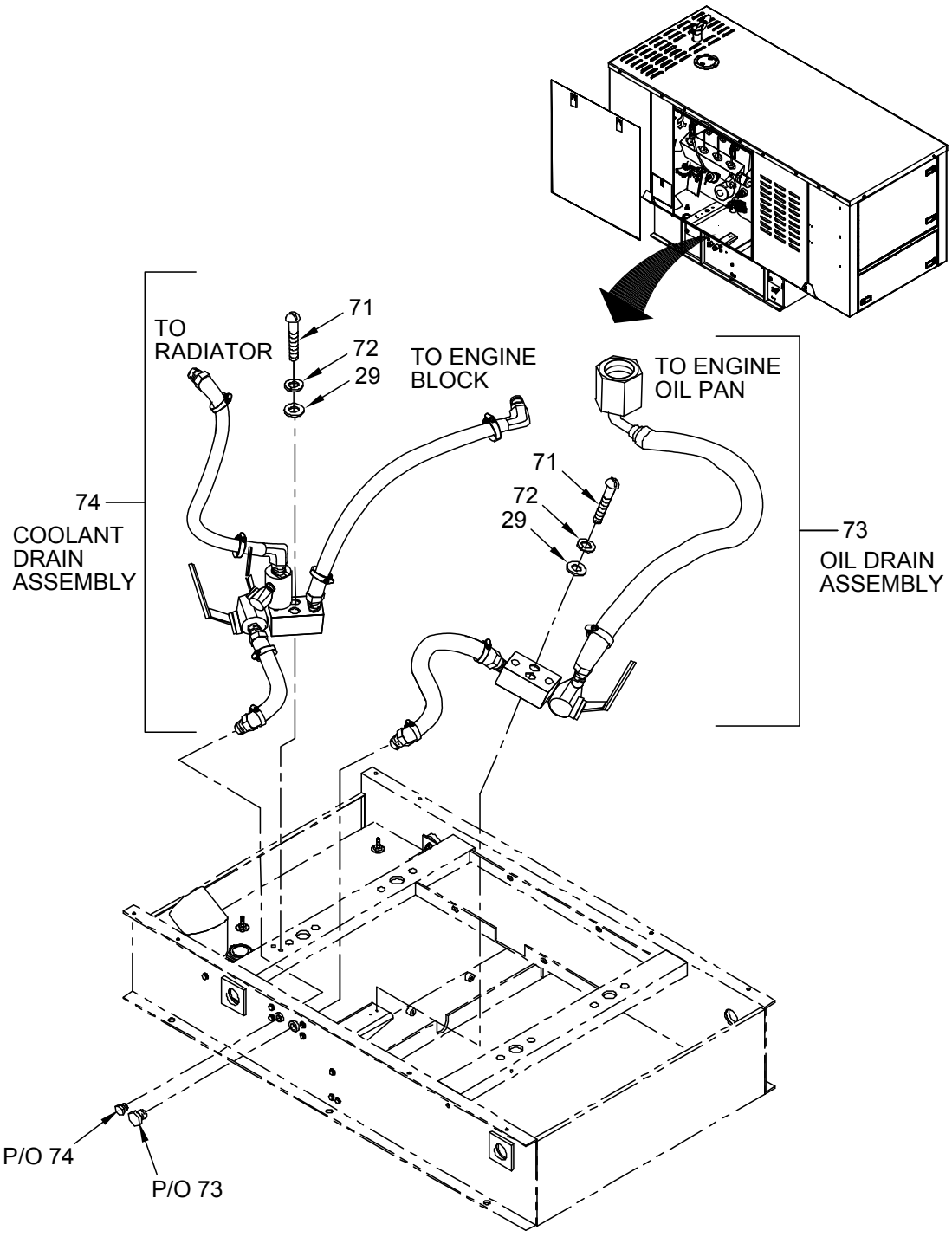


Figure 8. Generator, Diesel Engine, T282271G/T282271T (Sheet 5 of 10).

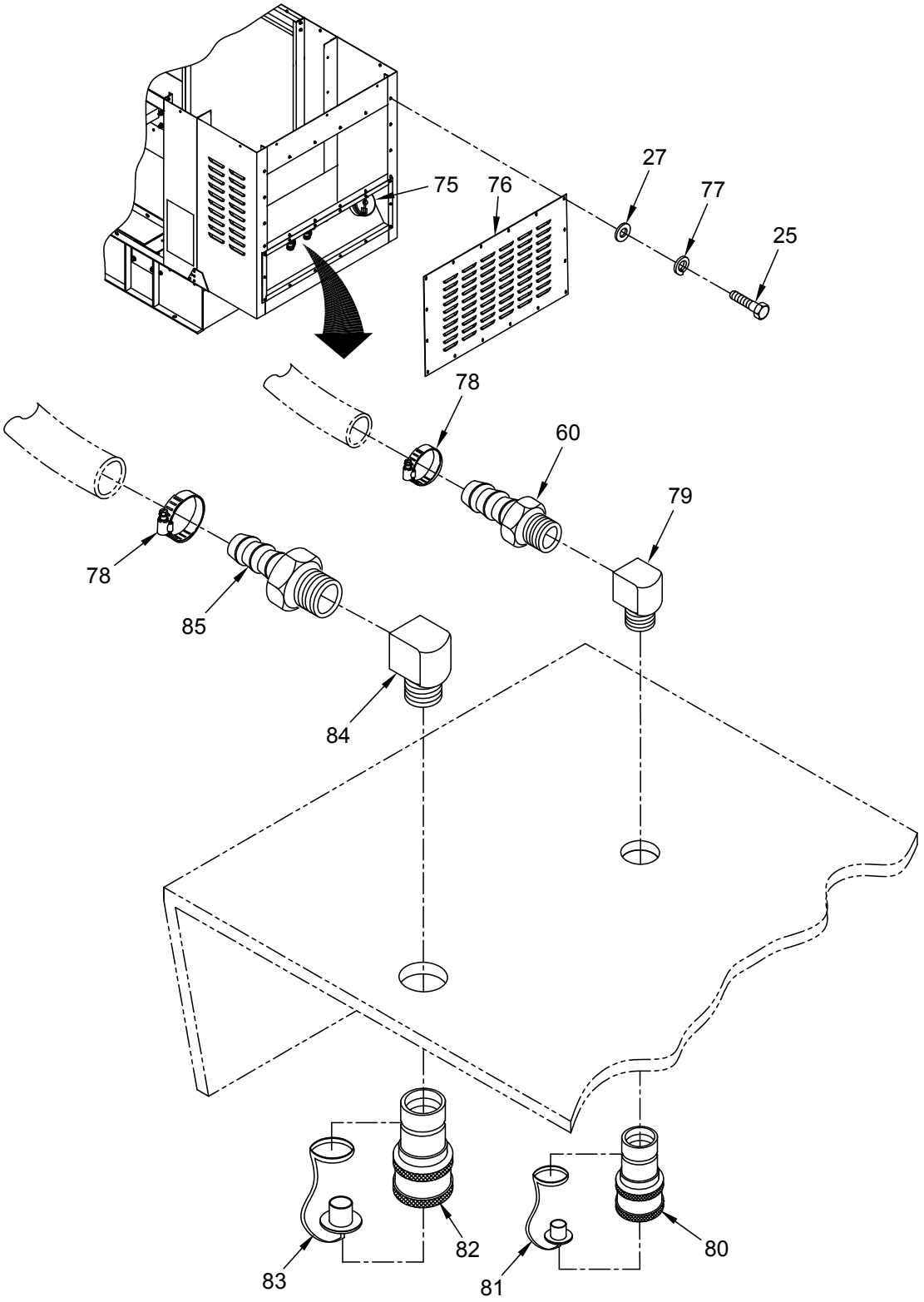


Figure 8. Generator, Diesel Engine, T282271G/T282271T (Sheet 6 of 10).

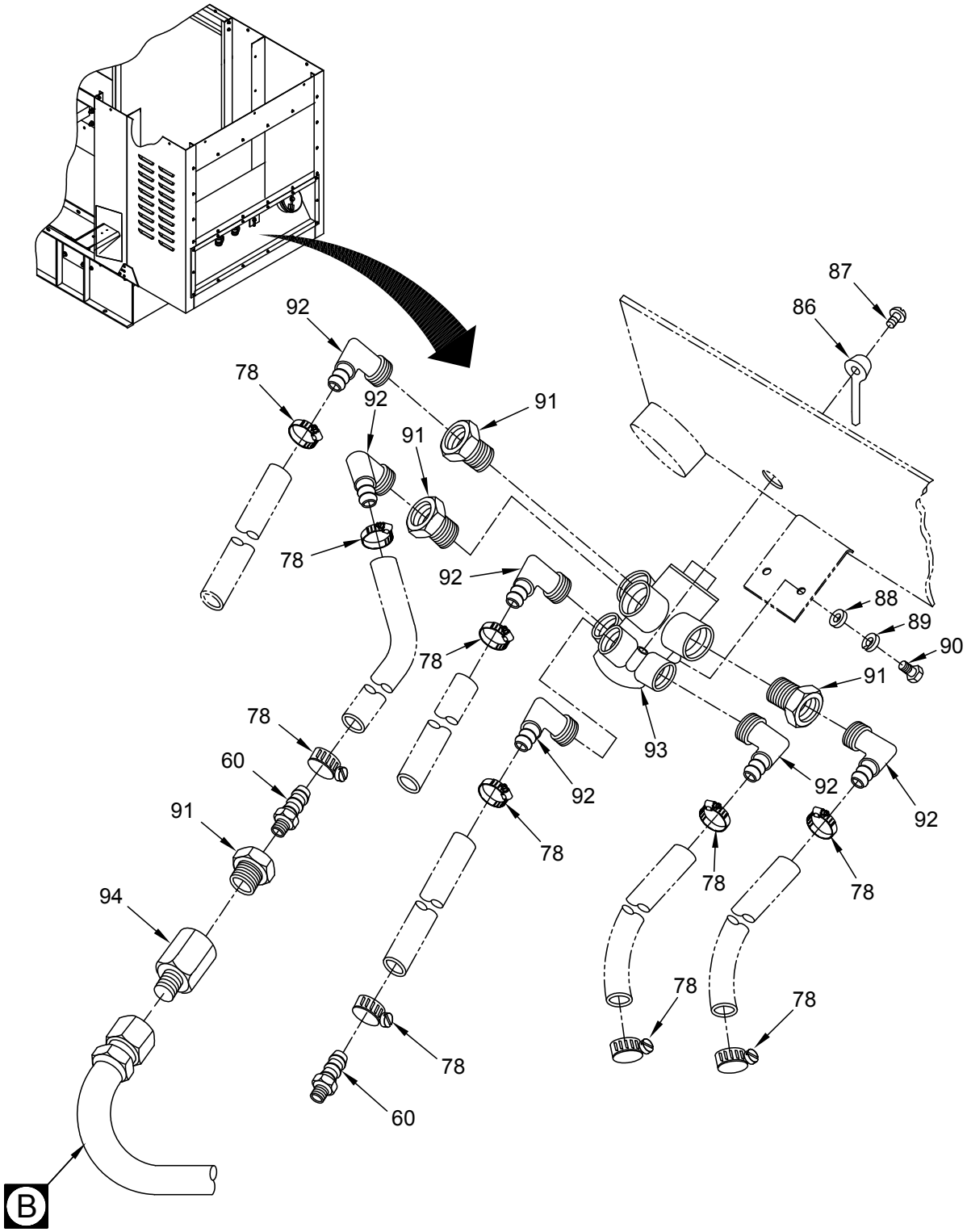


Figure 8. Generator, Diesel Engine, T282271G/T282271T (Sheet 7 of 10).

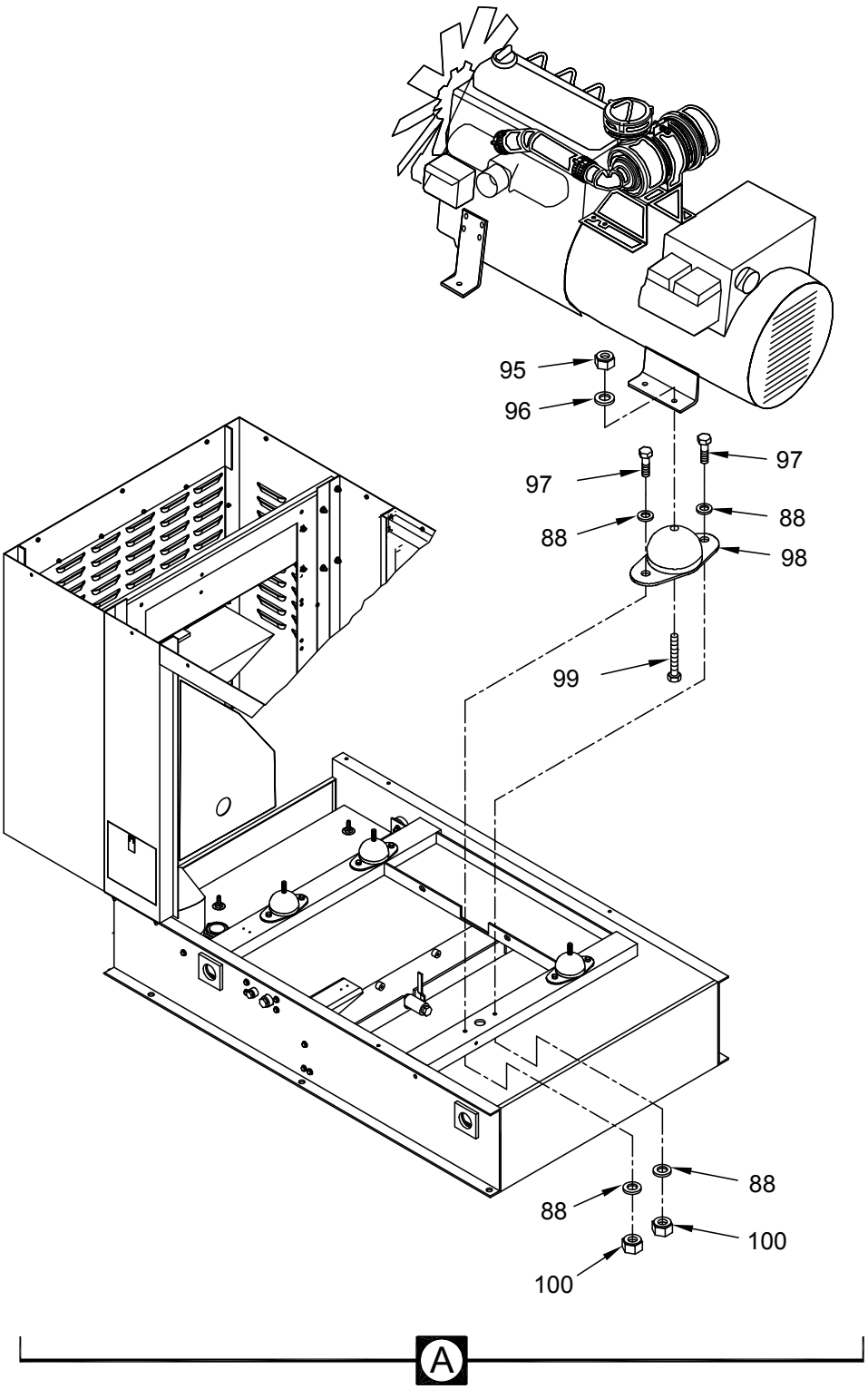


Figure 8. Generator, Diesel Engine, T282271G/T282271T (Sheet 8 of 10).

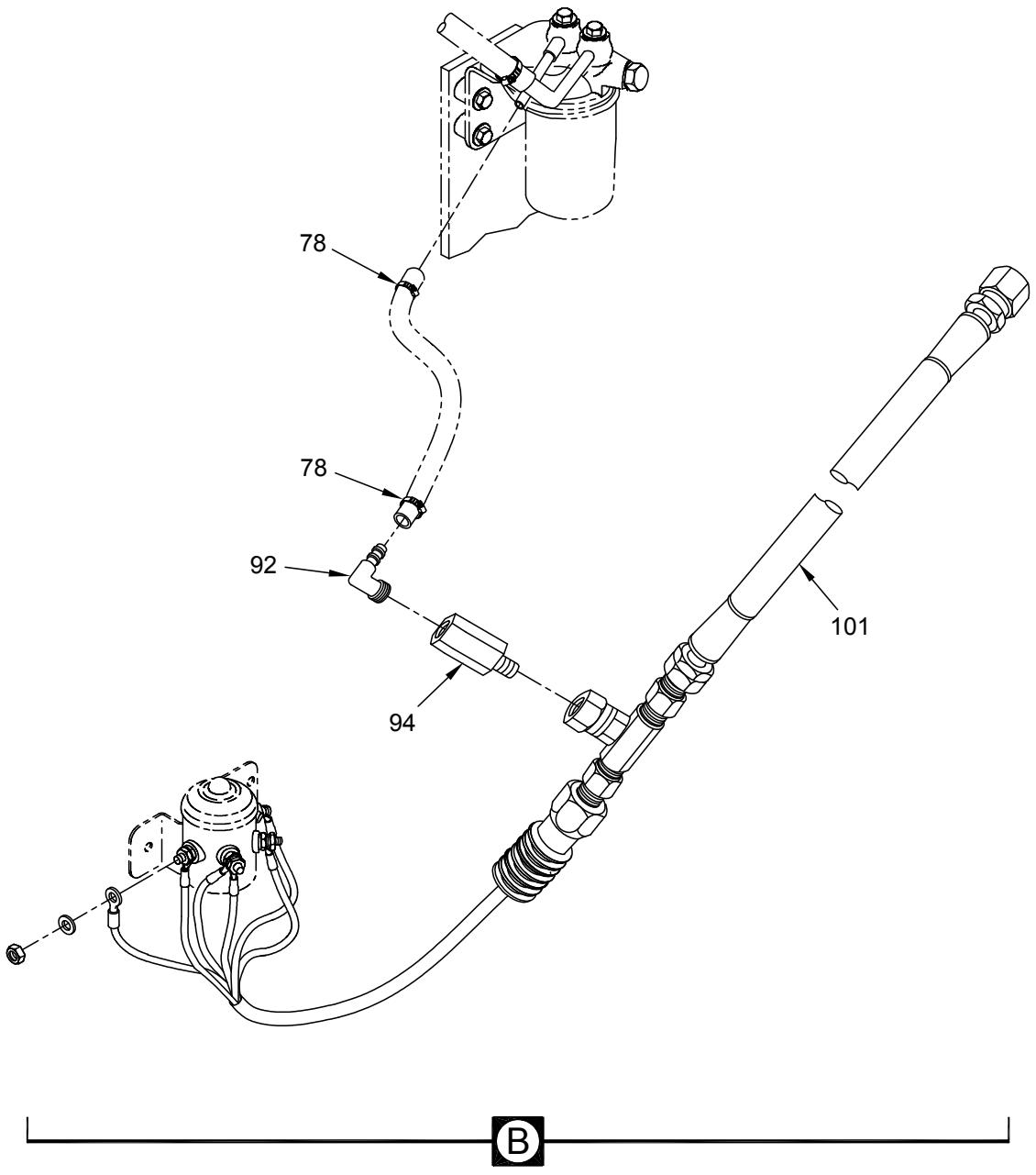


Figure 8. Generator, Diesel Engine, T282271G/T282271T (Sheet 9 of 10).

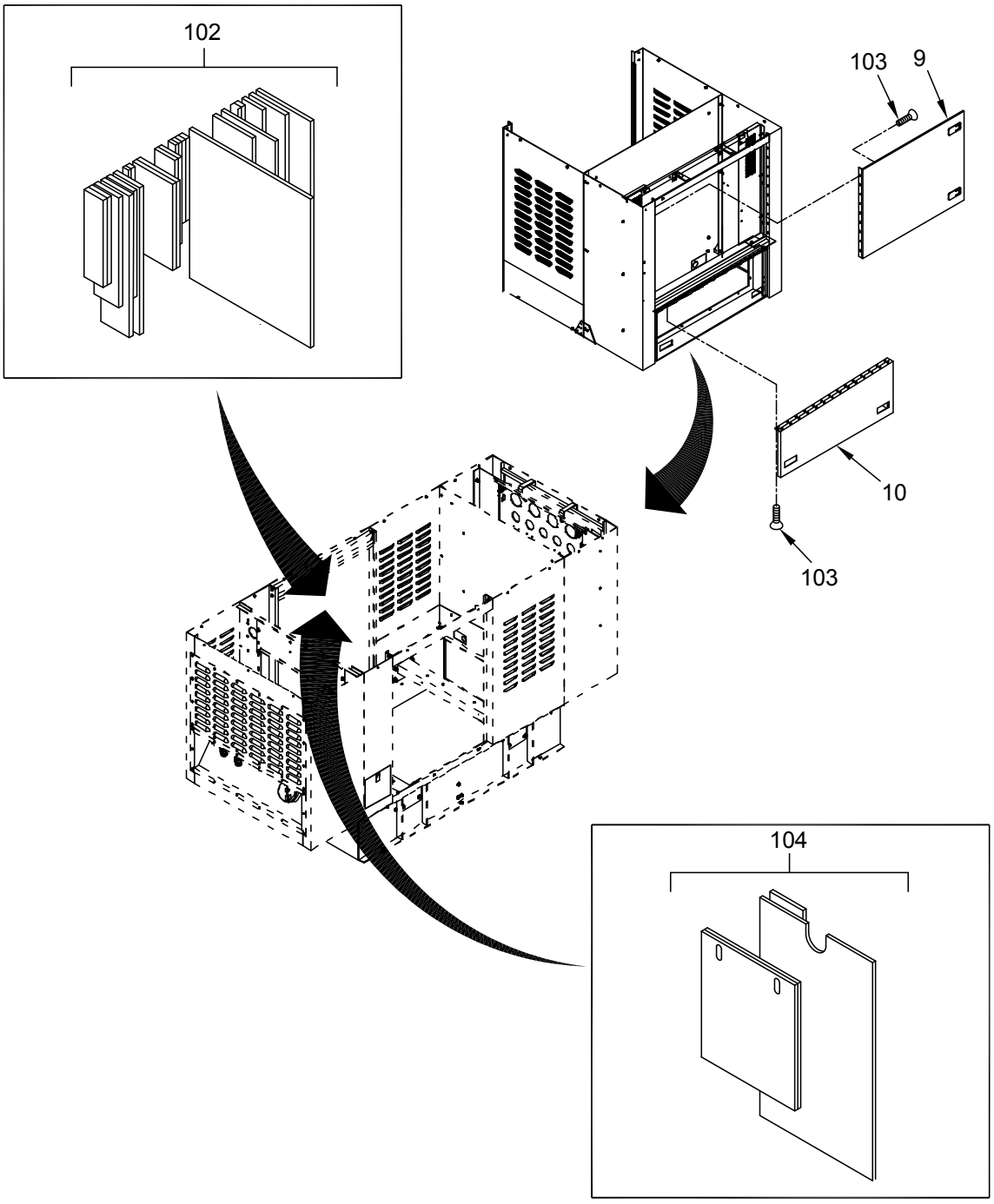


Figure 8. Generator, Diesel Engine, T282271G/T282271T (Sheet 10 of 10).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
					GROUP 0102	
					FIGURE 8 GENERATOR, DIESEL ENGINE T282271G/T282271T	
1	XBFZZ		0WFM3	1006874	PANEL,ACCESS ..... UOC: 89W	1
1	XBFZZ		0WFM3	1006873	PANEL,ACCESS ..... UOC: 89X	1
2	PAFZZ	5305-01-583-5489	1KDE3	8D50TXP10	SCREW,TAPPING	6
3	PAFZZ	5340-01-497-5810	0MCS5	DP40-B	COVER,ACCESS	1
4	XBFFF		0WFM3	T235064	BATTERY ASSEMBLY (SEE FIGURE 9 FOR BREAKDOWN)....	1
5	XBFZZ		0WFM3	1009994	PANEL,ACCESS ..... UOC: 89W	2
5	XBFZZ		0WFM3	1009995	PANEL,ACCESS ..... UOC: 89X	2
6	PAFZZ	5340-01-533-1330	94222	62-40-251-3	LEVER,MANUAL CONTROL	8
7	XCDDD		0WFM3	T225250-5	BARRIER PANEL ASSEMBLY (SEE FIGURE 17 FOR BREAKDOWN)	1
8	XCDDD		0WFM3	T225453	CONTROL PANEL ASSEMBLY (SEE FIGURE 15 FOR BREAKDOWN)	1
9	XBFZZ		0WFM3	1007404	PANEL,ACCESS ..... UOC: 89W	1
9	XBFZZ		0WFM3	1007405	PANEL,ACCESS ..... UOC: 89X	1
10	XBFZZ		0WFM3	TG430-2005G	PANEL,ACCESS ..... UOC: 89W	1
10	XBFZZ		0WFM3	TG430-2005T	PANEL,ACCESS ..... UOC: 89X	1
11	XCDDD		0WFM3	T225853	POWER DISTRIBUTION (SEE FIGURE 16 FOR BREAKDOWN)	1
12	PAFZZ	5310-01-569-2130	1KDE3	8CNNE1	NUT,SELF-LOCKING, HEXAGON.....	6
13	PAFZZ	5305-01-569-1803	1KDE3	8C75MXP1	SCREW,MACHINE.....	4
14	PAFZZ	5340-01-315-8389	57068	49-6080	STAY,LOCKING	2
15	PAFZZ	5305-01-568-4710	0WFM3	T270130	SCREW,MACHINE.....	2
16	XBFZZ	4210-01-259-5634	19207	12340842	BRACKET,FIRE EXTINGUISHER.....	1

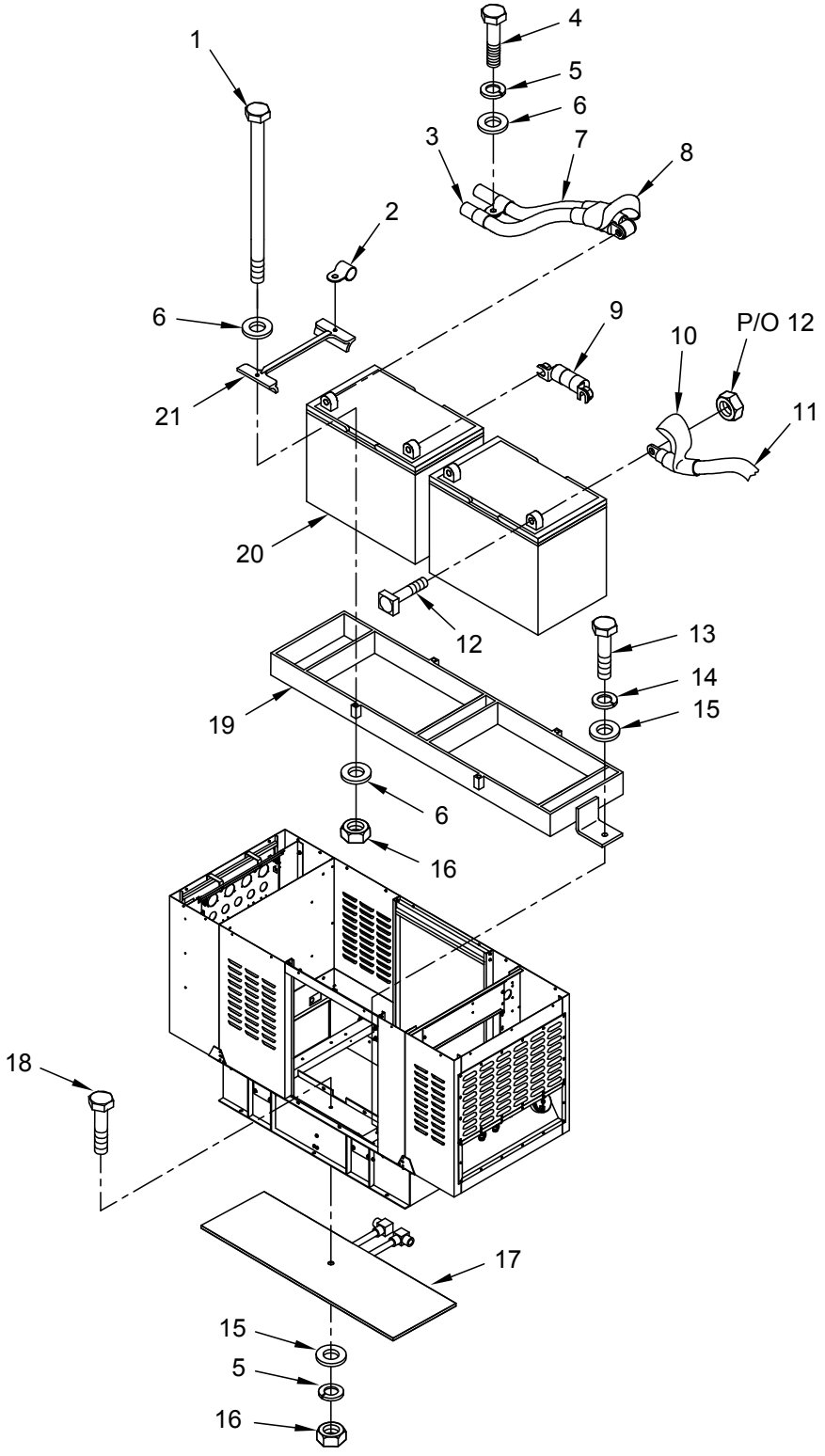
(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
17	PAFZZ	5320-01-025-6328	02126	AA-44-D	RIVET,BLIND	4
18	PAFZZ	4210-01-552-5109	49376	B402T	EXTINGUISHER,FIRE	1
19	PAFZZ	5310-01-533-2915	3A054	92771A535	NUT,PLAIN,WING	2
20	PAFZZ	5310-01-563-2566	3A054	93496A031	WASHER,LOCK	2
21	PAFZZ	5310-01-569-5414	39428	92916A405	WASHER,FLAT	36
22	PAFZZ	5310-01-485-7896	53711	123-1680562 PC 93	NUT,PLAIN,HEXAGON	2
23	PAFZZ	5307-01-569-2135	1KDE3	37C200RFTB	STUD,CONTINUOUS THREAD	1
24	PAFZZ	5340-01-267-2904	94277	62-70-15	FASTENER,PAWL	1
25	PAFZZ	5305-01-553-0345	1KDE3	10C100HCS10	SCREW,CAP,HEXAGON HEAD	36
26	PAFZZ	5310-01-555-6402	1KDE3	10DLOC1	WASHER, LOCK	20
27	PAFZZ	5310-01-555-7064	1KDE3	10DWFL10	WASHER,FLAT	36
28	PAFZZ	5305-01-552-4509	1KDE3	8C225MXP1	SCREW,MACHINE	6
29	PAFZZ	5310-01-553-0370	1KDE3	8NWFL1	WASHER,FLAT	10
30	PAFZZ	5310-01-552-4523	1KDE3	10DWFL1	WASHER,FLAT	6
31	XCFFF		0WFM3	TG421-9000	RADIATOR INSTALLATION (SEE FIGURE 13 FOR BREAKDOWN)	1
32	XCFFF		0WFM3	T235005	EXHAUST ASSEMBLY (SEE FIGURE 14 FOR BREAKDOWN)	1
33	XBFZZ	8340-01-557-3403	0WFM3	MA100155	BAG,TENT FRAME PART	1
34	PAFZZ	5995-01-552-6935	0WFM3	T295101	CABLE ASSEMBLY,SPECIAL PURPOSE,ELECTRICAL	2
35	PAFZZ	5995-01-552-8232	0WFM3	T295111	CABLE ASSEMBLY,SPECIAL PURPOSE,ELECTRICAL	1
36	XBFDD		0WFM3	T245264	ENGINE ASSEMBLY (SEE FIGURE 10 FOR BREAKDOWN)	1
37	PAFZZ	5995-01-552-6934	0WFM3	T295145	CABLE ASSEMBLY,SEPCIAL PURPOSE,ELECTRICAL	1
38	PAFZZ	5310-01-552-3984	1KDE3	25CNNE1	NUT,SELF-LOCKING, HEXAGON	3
39	PAFZZ	5310-01-552-2776	1KDE3	25NWFL1	WASHER,FLAT	19
40	PAFZZ	5310-01-533-2191	39428	94709A317	WASHER,SEAL	3
41	XBFZZ	5365-01-559-2443	1KDE3	25N62ZR5A	SPACER,PLATE	3
42	PAFZZ	5307-01-558-7259	44MG9	91887A	STUD,SHOULDERED	3
43	PAFZZ	2990-01-552-6325	44MG9	97359A	HEATER,COOLANT,ENGINE	1
44	PAFZZ	5920-01-123-5212	58536	AA55569/01-005	FUSE,INCLOSED LINK	1
45	PAFZZ	5920-01-149-6952	58536	AA55569/01-008	FUSE,INCLOSED LINK	1
46	PAFZZ	4730-01-492-6678	39428	5388K18	CLAMP,HOSE	12

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
47	PAFZZ	4720-01-570-0499	44MG9	50900126A	HOSE,METALLIC	1
48	PAFZZ	4730-01-552-2772	44MG9	330027	CLAMP,HOSE	8
49	PAFZZ	4720-01-552-9960	44MG9	484032	HOSE,NONMETALLIC	5
50	PAFZZ	4730-01-569-7756	39428	5520K302	REDUCER,PIPE	2
51	XBFZZ		44MG9	50483931A	FUEL LINE,PLASTIC	2
52	PAFZZ	2910-01-553-0046	44MG9	50487171A	FILTER ELEMENT,FLUID	1
53	PAFZZ	4730-01-552-6415	44MG9	1310763A	CLAMP,HOSE	1
54	PAFZZ	2910-01-553-0047	44MG9	86116A	PUMP,FUEL,ELECTRICAL	1
55	PAFZZ	5305-01-552-3987	1KDE3	25C100HCS1	SCREW,CAP,HEXAGON HEAD	1
56	PAFZZ	4120-01-568-9442	44MG9	5023298A	HOSE,METALLIC	1
57	PAFZZ	5310-01-523-1028	2V507	90313A109	WASHER,FLAT	1
58	PAFZZ		35871	150072751	CLAMP,HOSE	4
59	PAFZZ	4720-01-570-8936	04NP0	543-123	FUEL HOSE	1
60	PAFZZ	4730-01-552-0695	39428	5346K16	NIPPLE,HOSE	5
61	PAFZZ	5970-01-569-6555	0S745	282-200-7	INSULATOR,WASHER	4
62	PAFZZ	5305-01-559-2700	2KDE3	25C150HCS1	SCREW,CAP,HEXAGON HEAD	8
63	PAFZZ	5310-01-497-7828	39428	90257A029	NUT	8
64	XBFZZ		0WFM3	1003632	TUBE ASSEMBLY,METAL	1
65	XBFZZ		0WFM3	1003631	TUBE ASSEMBLY,METAL	1
66	PAFZZ	4730-00-014-4027	51900	8W8X543	PLUG,PIPE	1
67	PAFZZ	4810-01-569-5481	3P3A1	S92D41	VALVE,BALL	1
68	PAFZZ	4730-01-481-4962	39428	4568K173	NIPPLE,PIPE	1
69	PAFZZ	6680-00-838-1829	09393	8680-00032	GAGE,LIQUID QUANTITY, FLOAT TYPE	1
70	PAFZZ		0WFM3	TG430-5001G	TANK,FUEL,ENGINE UOC: 89W	1
70	PAFZZ		0WFM3	TG430-5001T	TANK,FUEL,ENGINE UOC: 89X	1
71	PAFZZ	5305-01-569-5454	1KDE3	8C175MXP1	SCREW,MACHINE	4
72	PAFZZ	5310-01-569-4411	1KDE3	8NLOC1	WASHER,LOCK	4
73	PAFZZ	4930-01-569-3237	0WFM3	T230020	OIL DRAIN ASSEMBLY	1
74	PAFZZ	4820-01-570-4489	0WFM3	T230019	COOLANT DRAIN ASSEMBLY	1
75	PAFZZ	5340-01-334-5735	10203	5557-9	CAP,FILLER OPENING	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
76	XBFZZ		0WFM3	1002734	PANEL,ACCESS UOC: 89W	1
76	XBFZZ		0WFM3	1002735	PANEL,ACCESS UOC: 89X	1
77	PAFZZ	5310-01-569-0373	1KDE3	10DLOC10	WASHER,LOCK	16
78	PAFZZ	4730-01-424-5432	39428	5321K14	CLAMP,HOSE	12
79	PAFZZ	4730-01-569-5438	4ELU8	116C	ELBOW,PIPE	1
80	PAFZZ	4730-00-795-6959	0C3R0	TH2-16-002	PLUG,QUICK DISCONNECT	1
81	PAFZZ	5340-01-569-5472	0XUE9	FCB2DP	CAP,PROTECTIVE,DUST AND MOISTURE SEAL	1
82	PAFZZ	4730-00-602-5342	0C3R0	TH3-21-002	COUPLING,HALF,QUICK DISCONNECT	1
83	PAFZZ	5340-01-569-5997	0XUE9	FCB3DP	CAP,PROTECTIVE,DUST AND MOISTURE SEAL	1
84	PAFZZ	4730-01-569-4203	4ELU8	116E	ELBOW, PIPE	1
85	PAFZZ	4730-01-399-1866	39428	5346K26	ADAPTER,STRAIGHT,PIPE TO HOSE	1
86	PAFZZ	5340-01-569-5467	70411	8X61	LEVER,MANUAL CONTROL	1
87	PAFZZ	5305-01-569-7937	39428	91785A240	SCREW,MACHINE	1
88	PAFZZ	5310-01-552-8314	1KDE3	37NWFL1	WASHER,FLAT	18
89	PAFZZ	5310-01-558-7178	1KDE3	37NLOC1	WASHER,LOCK	2
90	PAFZZ	5305-01-531-7264	39428	92620A622	SCREW,CAP,HEXAGON HEAD	2
91	PAFZZ	4730-01-561-5843	3A054	50785K66	BUSHING,PIPE	4
92	PAFZZ	4730-01-581-3294	39428	53525K18	ELBOW,HOSE TO BOSS	7
93	PAFZZ	2910-00-977-5495	70411	SK1036	VALVE FUEL	1
94	PAFZZ	4730-01-568-4716	0PHX5	0203-8-10	ADAPTER BUSHING	2
95	PAFZZ	5310-01-559-2446	1KDE3	50CNNE1	NUT,SELF-LOCKING, HEXAGON	4
96	PAFZZ	5310-01-554-1192	1KDE3	50N125WSP1	WASHER,FLAT	4
97	PAFZZ	5305-01-553-0414	1KDE3	37C125HCS1	SCREW,CAP,HEXAGON HEAD	8
98	PAFZZ		5P059	52545-1	MOUNT,RESILIENT,GENERAL PURPOSE	4
99	PAFZZ	5305-01-570-2471	1KDE3	50C125HCS1	SCREW,CAP,HEXAGON HEAD	4
100	PAFZZ	5310-01-558-7184	1KDE3	37CNFH1	NUT,PLAIN,HEXAGON	8
101	PAFZZ	4720-01-570-0575	47886	D3085-2118-DHS	HOSE ASSEMBLY, NONMETALLIC	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
102	PAFZZ		0WFM3	1002532	FOAM KIT,REPLACEMENT.....	1
103	PAFZZ		1QNZ3	72662	SCREW,MACHINE.....	23
104	PAFZZ		0WFM3	1002533	FOAM KIT,REPLACEMENT.....	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
BATTERY ASSEMBLY, T235064



VERSION 1

Figure 9. Battery Assembly, T235064 (Sheet 1 of 3).

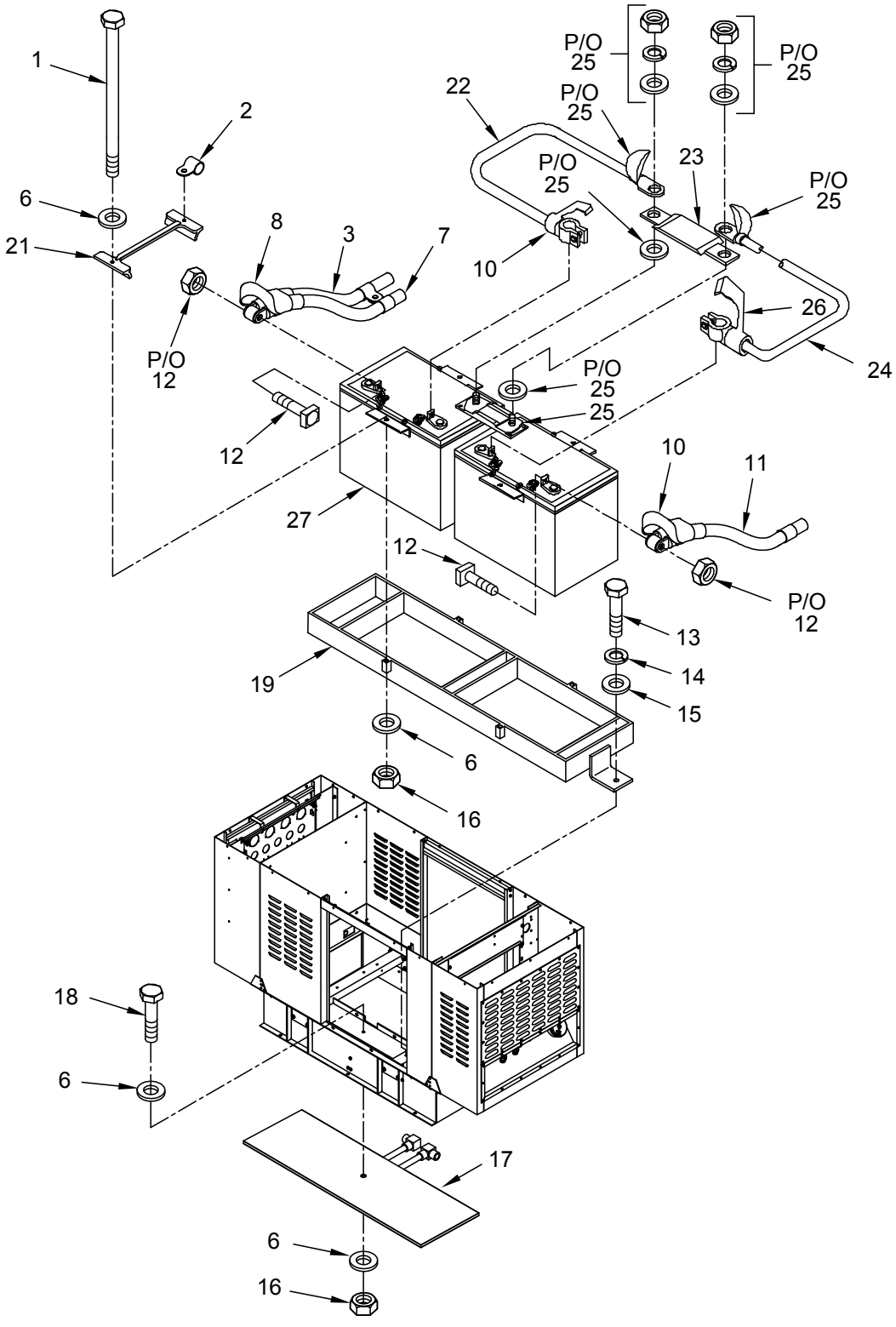


Figure 9. Battery Assembly, T235064 (Sheet 2 of 3).

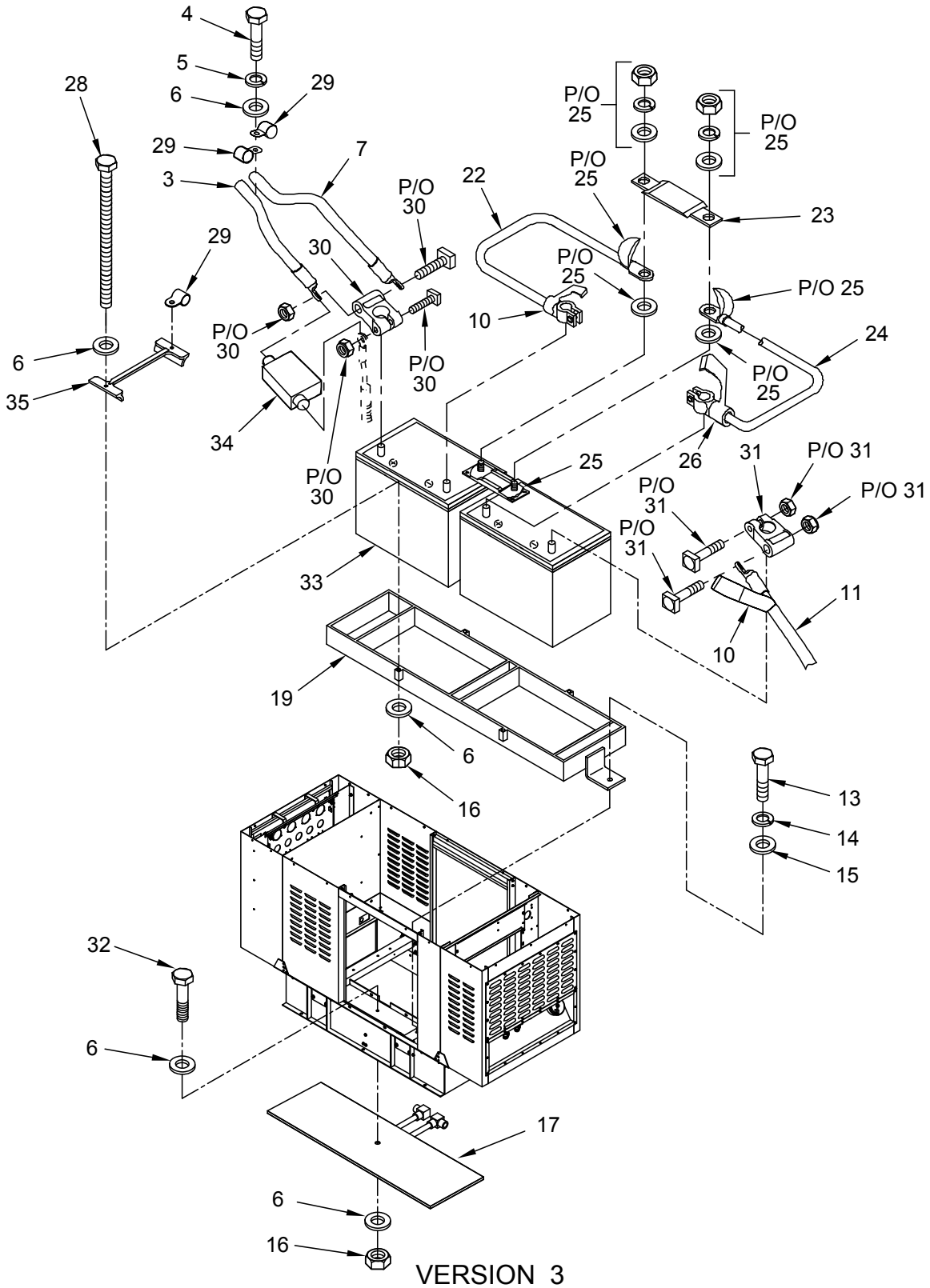


Figure 9. Battery Assembly, T235064 (Sheet 3 of 3).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010201	
					FIGURE 9 BATTERY ASSEMBLY T235064	
1	PAFZZ	5305-01-552-0691	39428	92240A559	SCREW,CAP,HEXAGON HEAD	4
2	PAFZZ		39428	15K200140-53	CLAMP,CABLE	7
3	PAFZZ	6150-01-552-5717	4DZX8	106538R	LEAD,STORAGE BATTERY	1
4	PAFZZ	5305-01-552-3987	1KDE3	25C100HCS1	SCREW,CAP,HEXAGON HEAD	1
5	PAFZZ	5310-01-552-3994	1KDE3	25NLOC1	WASHER,LOCK	2
6	PAFZZ	5310-01-552-2776	1KDE3	25NWFL1	WASHER,FLAT	10
7	PAFZZ	6150-01-552-6221	4DZX8	105038R	LEAD,STORAGE BATTERY	1
8	PAFZZ	5940-01-552-9284	4DZX8	5726-050-R	COVER,TERMINAL	1
9	PAFZZ	5920-01-552-0369	25795	1EM94	FUSE LINK,ELECTRICAL	1
10	PAFZZ	5940-01-552-9497	4DZX8	5724-050-B	COVER,TERMINAL	1
11	PAFZZ	6150-01-553-0934	4DZX8	108038B	LEAD,STORAGE BATTERY	1
12	PAFZZ	5306-01-552-9145	4DZX8	99051	BOLT,MACHINE	4
13	PAFZZ	5305-01-553-0414	1KDE3	37C125HCS1	SCREW,CAP,HEXAGON HEAD	2
14	PAFZZ	5310-01-552-3975	1KDE3	31NLOC1	WASHER,LOCK	2
15	PAFZZ	5310-01-552-8314	1KDE3	37NWFL1	WASHER,FLAT	3
16	PAFZZ	5310-01-552-3984	1KDE3	25CNNE1	NUT,SELF-LOCKING, LOCKING,HEXAGON	5
17	XBFZZ		29186	BH-2124	WARMER,BATTERY	1
18	PAFZZ	5305-01-552-9209	1KDE3	25C200HCS1	SCREW,CAP,HEXAGON HEAD	1
19	XBFZZ		0WFM3	T220076	BRACKET,BATTERY SUPPORT	1
20	PCFZZ	6140-01-482-9031	56309	PS-12750	BATTERY,STORAGE	2
21	XBFZZ		0WGM8	10-15-55P	RETAINER,BATTERY	2
22	PAFZZ	6150-01-581-6751	4DZX8	101038N	LEAD,STORAGE BATTERY	1
23	PAFZZ	5920-01-581-6939	7Z043	MFC336175	FUSE,LINK,ELECTRICAL	1
24	PAFZZ	6150-01-581-6746	4DZX8	101038P	LEAD,STORAGE BATTERY	1
25	PAFZZ	5920-01-581-6929	7Z043	MFB736N9N02	FUSEHOLDER,BLOCK	1
26	PAFZZ	5940-01-581-6740	4DZX8	5724-050-R	COVER,TERMINAL	1
27	PCFZZ		0CV85	24AGM	BATTERY,STORAGE	2
28	PAFZZ		0Y3H3	10332-04277	SCREW,CAP,HEXAGON HEAD	4

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
29	PAFZZ	5340-01-570-3916	0Y3H3	0708779	CLAMP,LOOP	3
30	PAFZZ	5940-01-338-1965	33609	5350	TERMINAL,LUG	1
31	PAFZZ	5940-01-337-3316	33609	5349	TERMINAL,LUG	1
32	PAFZZ	5305-01-558-7714	1KDE3	25C175HCS1	SCREW,CAP,HEXAGON HEAD	1
33	PCFZZ		0CV85	9A34	BATTERY,STORAGE	2
34	PAFZZ		4DZX8	5730-000R	COVER,TERMINAL	1
35	XBFZZ		0WGM8	12-1004	RETAINER,BATTERY	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
ENGINE ASSEMBLY, T245264

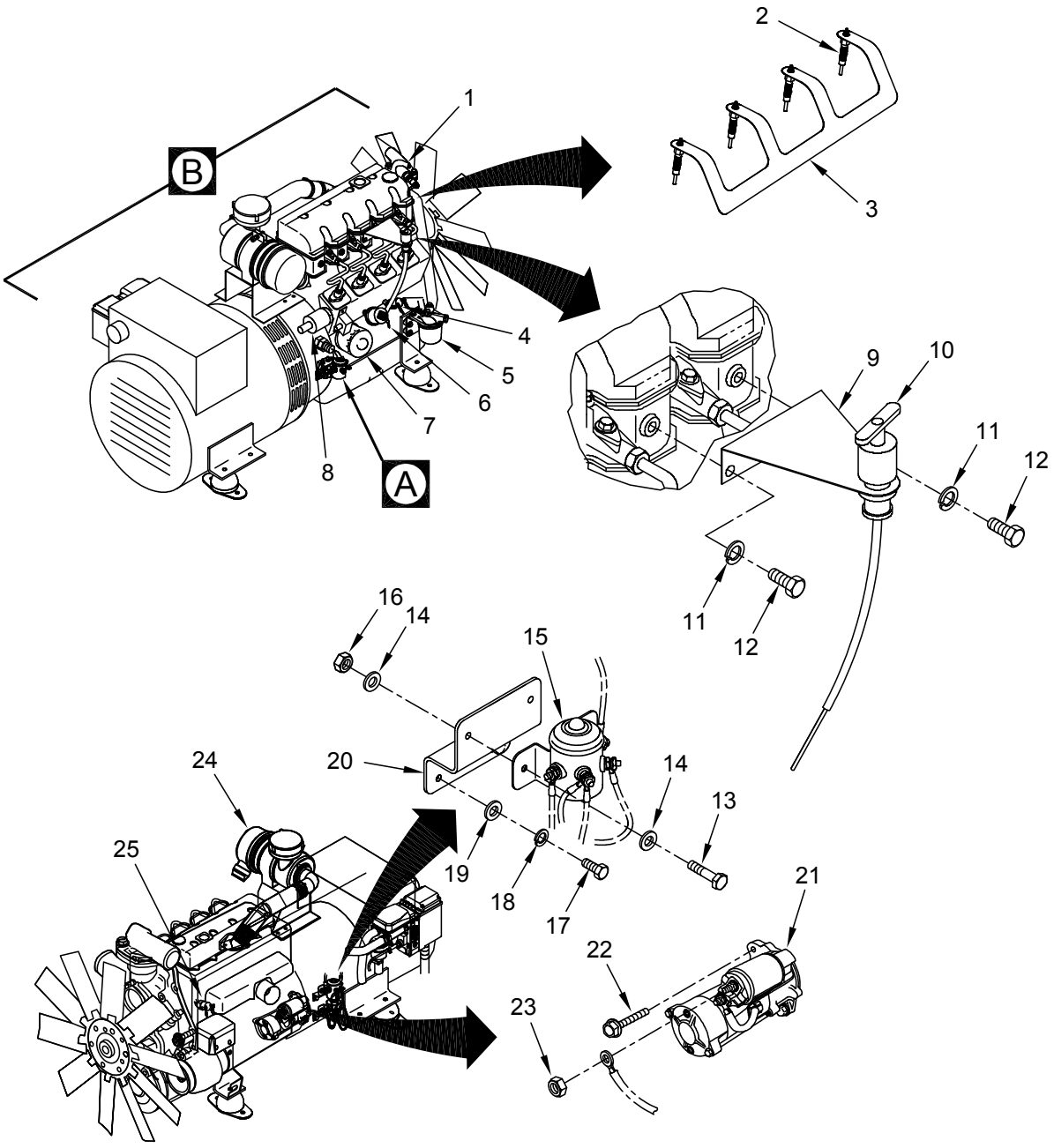


Figure 10. Engine Assembly, T245264 (Sheet 1 of 5).

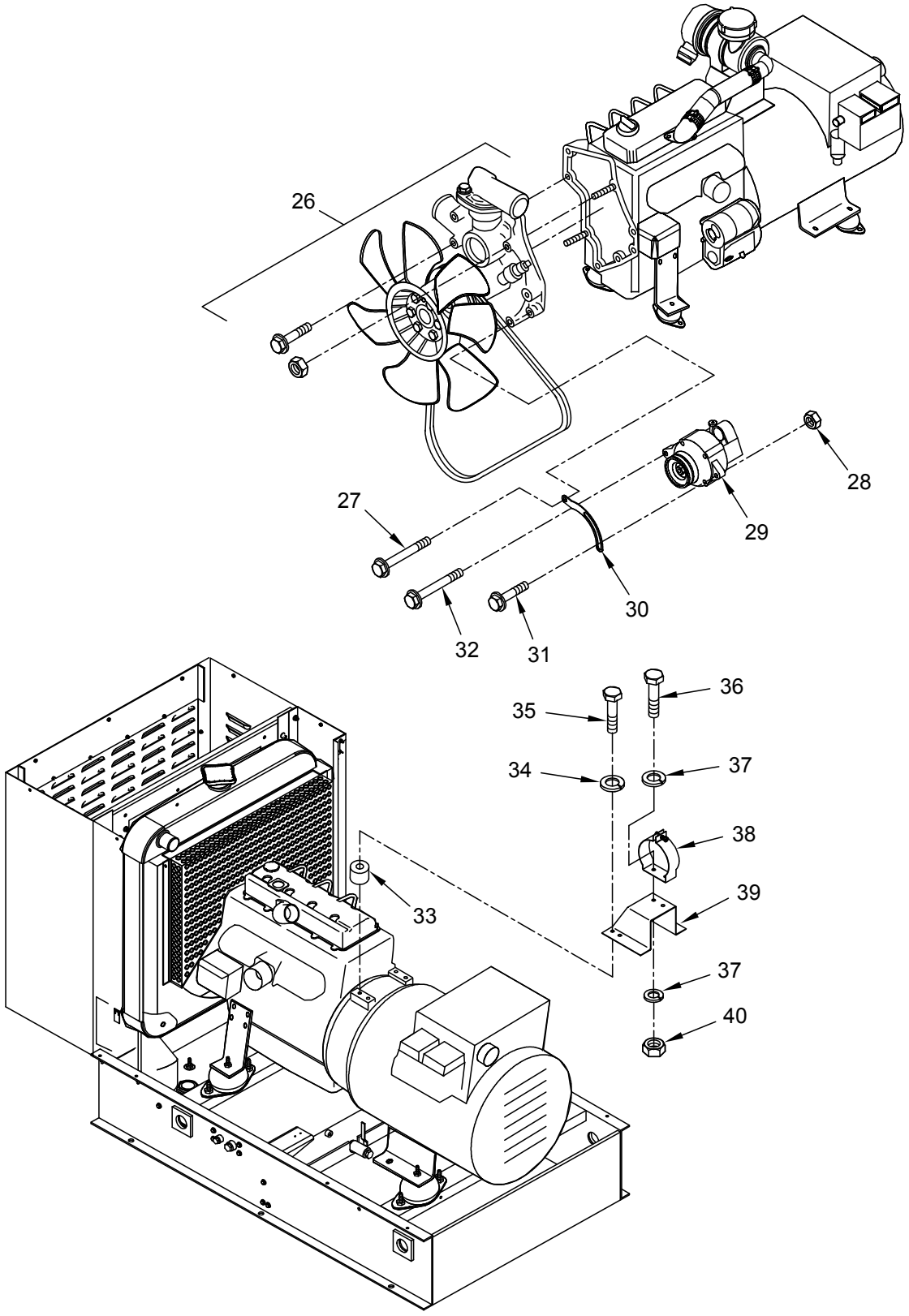


Figure 10. Engine Assembly, T245264 (Sheet 2 of 5).

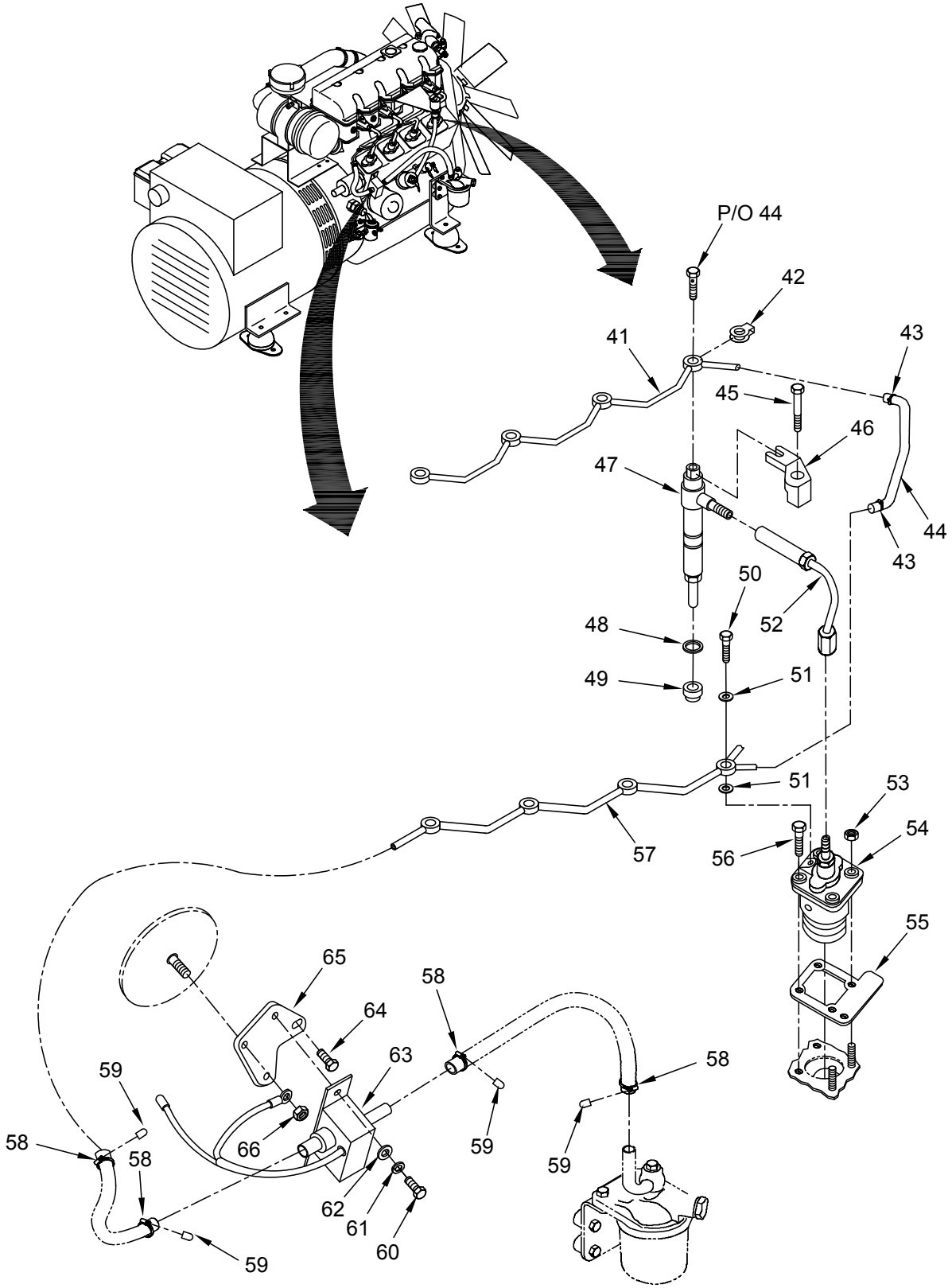


Figure 10. Engine Assembly, T245264 (Sheet 3 of 5).

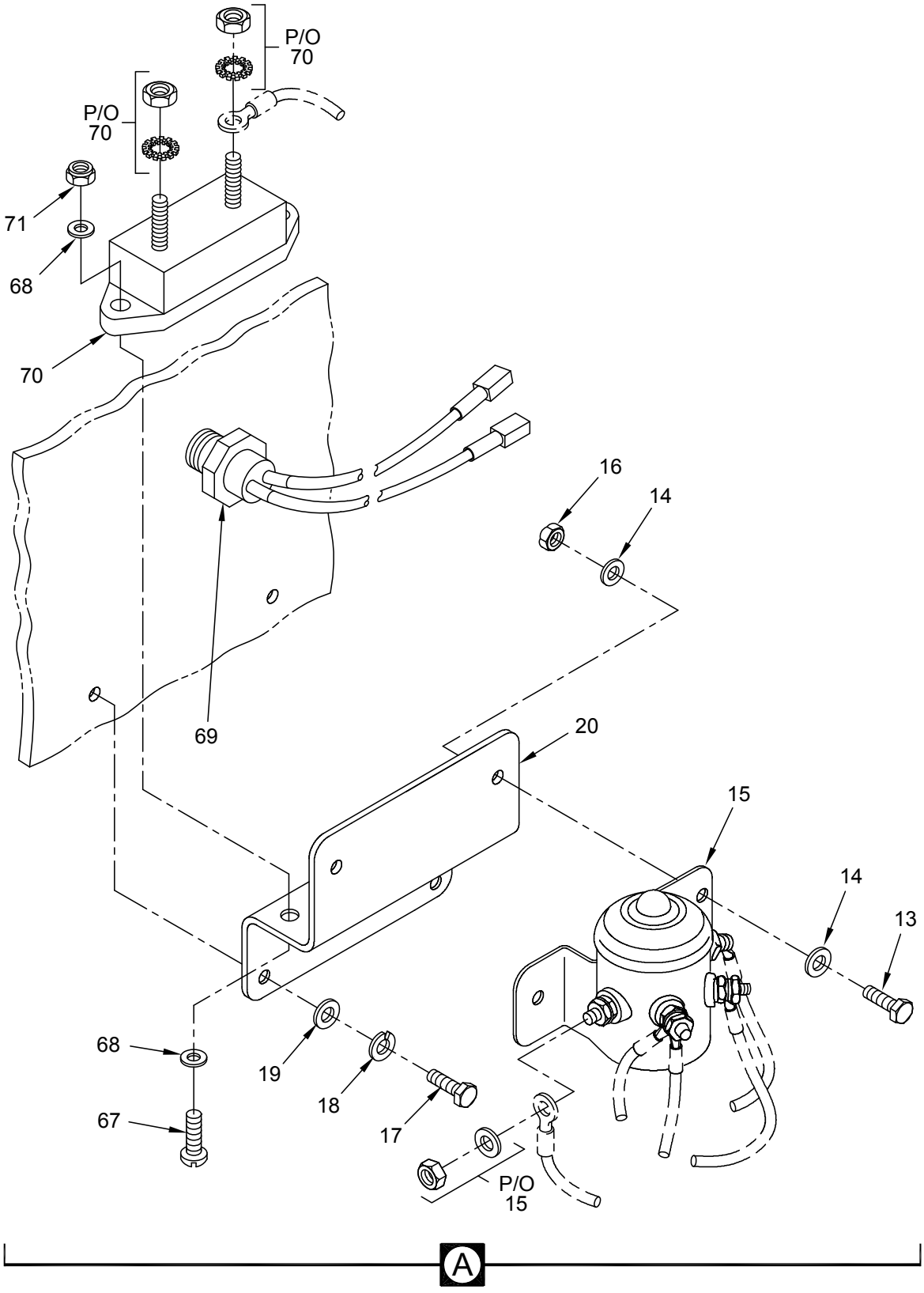


Figure 10. Engine Assembly, T245264 (Sheet 4 of 5).

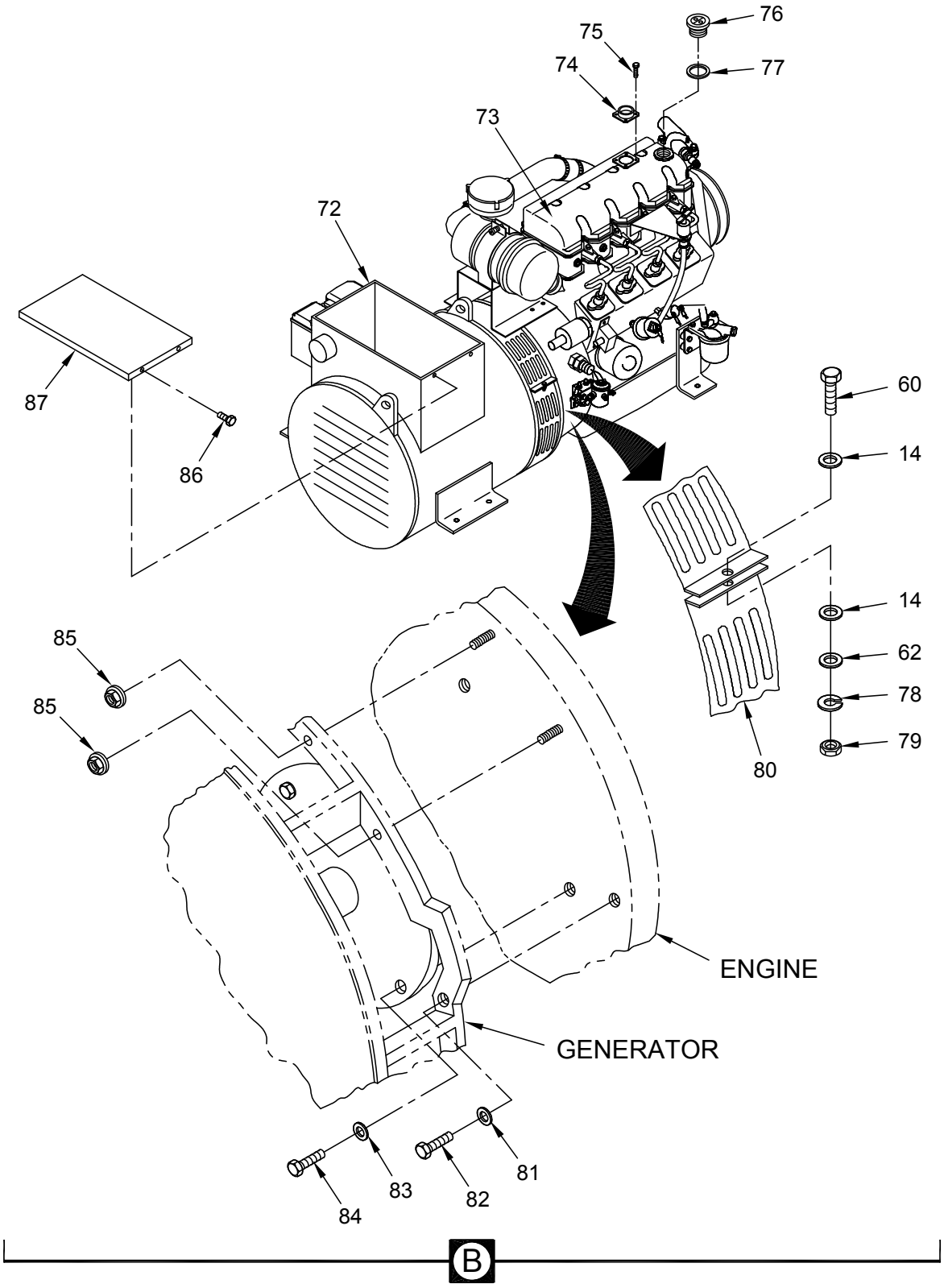


Figure 10. Engine Assembly, T245264 (Sheet 5 of 5).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
					GROUP 010202 FIGURE 10 ENGINE ASSEMBLY T245264	
1	PAFZZ	6685-01-553-1307	29186	MACK906	TRANSMITTER, TEMPERATURE,ELECTRICAL RESISTANCE	1
2	PAFZZ	2920-01-552-6309	29186	8-97047604-0	GLOW PLUG	4
3	XBFZZ		29186	8-97229381-0	CONNECTOR STRIP	1
4	PAFZZ	5930-01-553-5296	85814	SM-2B-15FVTAU	SWITCH,PRESSURE	1
5	PAFZZ	2910-01-552-9726	29186	8-97172549-0	FILTER ELEMENT,FLUID	1
6	PAFZZ	6620-01-553-4096	29186	02504-0	TRANSMITTER,PRESSURE	1
7	PAFZZ	2940-01-552-6301	29186	8-94456741-2	FILTER ELEMENT,FLUID	1
8	PAFZZ	5945-01-552-1084	29186	010-9229	ELECTROMAGNETIC ACTUATOR	1
9	XBFZZ		29186	MACK1067	BRACKET, MOUNTING	1
10	PAFZZ		29186	65202400	FILLER NECK,LIQUID	1
11	PAFZZ	5310-01-553-0365	29186	80277	WASHER,LOCK	2
12	PAFZZ	5305-01-553-0377	1KDE3	80C160HCS1933	SCREW,CAP,HEXAGON HEAD	2
13	PAFZZ	5305-01-553-0350	1KDE3	25C75HCS1W	SCREW,CAP,HEXAGON HEAD	6
14	PAFZZ	5310-01-552-2776	1KDE3	25NWFL1	WASHER,FLAT	13
15	PAFZZ	5945-01-553-3177	1AS48	24063	SOLENOID,ELECTRICAL	3
16	PAFZZ	5310-01-552-3984	1KDE3	25CNNE1	NUT, SELF-LOCKING, HEXAGON	6
17	PAFZZ	5305-01-559-4711	1KDE3	37C75HCS1	SCREW,CAP,HEXAGON HEAD	6
18	PAFZZ	5310-01-558-7178	1KDE3	37NLOC1	WASHER,LOCK	6
19	PAFZZ	5310-01-552-8314	1KDE3	37NWFL1	WASHER,FLAT	6
20	XBFZZ		0WFM3	T230007	BRACKET, DOUBLE-ANGLE	3
21	PAFZZ	2920-01-552-6314	29186	8972248131	STARTER,ENGINE, ELECTRICAL	1
22	PAFZZ	5306-01-552-8662	29186	0-28181230-0	BOLT,MACHINE	2
23	PAFZZ	5310-01-552-8308	29186	9-09111408-0	NUT,PLAIN,HEXAGON	1
24	XCFFF		0WFM3	1003392	AIR INTAKE INSTALLATION (SEE FIGURE 12 FOR BREAKDOWN)	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
25	PAOZZ	5930-01-553-4145	29186	TM-2A-230RAU	SWITCH,THERMOSTATIC…….	1
26	XCFFF		0WFM3	TG440-0001	COOLING SYSTEM INSTALLATION (SEE FIGURE 11 FOR BREAKDOWN)	1
27	PAFZZ		4N530	028050-8450	BOLT,MACHINE.....	1
28	PAFZZ	5310-01-552-8613	29186	0-91150210-0	NUT,PLAIN,HEXAGON.....	1
29	PAFZZ	2920-01-553-0314	29186	8-97233412-1	GENERATOR,ENGINE ACCESSORY	1
30	XBFZZ	5340-01-548-4360	4N530	897231-5790	BRACKET,MOUNTING.....	1
31	PAFZZ	5306-01-552-8738	29186	0-28081070-0	BOLT,MACHINE.....	1
32	PAFZZ	5306-01-552-8648	29186	0-28080820-0	BOLT,MACHINE.....	1
33	XBFZZ		29186	X-14330186-0	SPACER.....	4
34	PAFZZ	5310-01-552-3971	29186	X-09150-002	WASHER,LOCK.....	4
35	PAFZZ	5306-01-552-4514	29186	X-09055-048	BOLT,MACHINE.....	4
36	PAFZZ	5306-01-552-8668	29186	X-09055-006	BOLT,MACHINE.....	2
37	PAFZZ	5310-01-552-8350	29186	X-09150-001	WASHER,LOCK.....	2
38	XBFZZ		29186	X-14210-056	BRACKET,SUPPORT	1
39	XBFZZ		29186	X-14330-193	BRACKET,MOUNTING.....	1
40	PAFZZ	5310-01-552-8714	29186	0-91150208-0	NUT,PLAIN,EXTENDED WASHER,HEXAGON	2
41	PAFZZ		4N530	897217-2492	TUBE ASSEMBLY,METAL.....	1
42	PAFZZ	5330-01-569-0386	4N530	897232-3341	GASKET	4
43	PAFZZ	5340-01-547-8512	4N530	509707-0051	CLIP,RETAINING	2
44	PAFZZ		4N530	897247-9890	HOSE,RUBBER	1
45	PAFZZ	5306-01-569-7926	4N530	894433-7171	BOLT,MACHINE.....	1
46	XBFZZ		4N530	897195-2593	BRACKET,MOUNTING.....	4
47	PAFZZ	2910-01-569-0390	4N530	897289-2930	INJECTOR ASSEMBLY,FUEL.....	4
48	PAFZZ	5330-01-569-0380	29186	894326-4390	GASKET	4
49	PAFZZ	5330-01-569-0369	29186	897171-3310	GASKET	4
50	PAFZZ	5306-01-547-8487	4N530	894379-6880	BOLT,EYE	4
51	PAFZZ	5330-01-226-8689	04627	324444	GASKET	8
52	PAFZZ		4N530	898097-1600	TUBE ASSEMBLY,METAL.....	4
53	PAFZZ	5310-01-570-5993	4N530	091180-2080	NUT,PLAIN,HEXAGON.....	8
54	PAFZZ		4N530	898096-5800	PUMP,INJECTION	4
55	PAFZZ	5365-01-569-7918	4N530	897227-2851	SHIM.....	4
56	PAFZZ	5306-01-547-8472	4N530	028080-8200	BOLT,MACHINE.....	8
57	PAFZZ		4N530	897314-8610	TUBE ASSEMBLY,METAL.....	1
58	PAFZZ	4730-01-569-0826	29186	58832	CLAMP,HOSE	4

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
59	PAFZZ		1KNF0	RE0062-0470	COVER,PROTECTIVE	4
60	PAFZZ	5305-01-554-5224	39428	91280A334	SCREW,CAP,HEXAGON HEAD	3
61	PAFZZ	5310-01-553-6196	39428	91202A234	WASHER,LOCK	2
62	PAFZZ	5310-01-466-2747	39428	93475A250	WASHER,FLAT	3
63	PAFZZ	2910-01-553-1272	29186	8-94425751-1	PUMP,FUEL,ELECTRICAL	1
64	PAFZZ	5306-01-570-6401	4N530	028050-6120	BOLT,MACHINE	1
65	XBFZZ		29186	MACK1065	BRACKET,MOUNTING	1
66	PAFZZ	5310-01-570-5969	4N530	897329-6220	NUT,BLANK	1
67	PAFZZ	5305-01-569-1803	1KDE3	8C75MXP1	SCREW,MACHINE	2
68	PAFZZ	5310-01-553-0370	1KDE3	8NWFL1	WASHER,FLAT	4
69	PAFZZ	2815-01-552-9950	29186	X-83121-014-0	SPEED SENSOR,DIESEL	1
70	PAFZZ	5925-01-569-0250	82647	SDLA-350749	CIRCUIT BREAKER	1
71	PAFZZ	5310-01-569-2130	1KDE3	8CNNE1	NUT,SELF-LOCKING HEXAGON	2
72	PAFDD		0WFM3	T240200	GENERATOR SET,DIESEL ENGINE	1
73	PAFDD		0WFM3	1006230	ENGINE,DIESEL	1
74	PAFZZ		4N530	894329-5490	BREATHER FILTER,EMISSION CONTROL	1
75	PAFZZ		4N530	036220-4100	SCREW,SELF-LOCKING	4
76	PAFZZ	2590-01-450-6882	4N530	894133-2075	CAP,FILLER,OPENING	1
77	PAFZZ		4N530	894123-6231	GASKET	1
78	PAFZZ	5310-01-552-3994	1KDE3	25NLOC1	WASHER,LOCK	1
79	PAFZZ	5310-01-572-6753	39428	92497A350	NUT,PLAIN,HEXAGON	1
80	XBFZZ	6115-01-577-7123	38151	720366-01	GUARD,FAN IMPELLER	1
81	PAFZZ	5310-01-569-0412	29186	87511	WASHER,FLAT	8
82	PAFZZ	5305-01-569-0843	29186	82149	SCREW,CAP,HEXAGON HEAD	6
83	PAFZZ	5310-01-569-0415	29186	87510	WASHER,FLAT	8
84	PAFZZ	5305-01-569-0831	29186	4282	SCREW,CAP,HEXAGON HEAD	8
85	PAFZZ	5310-01-569-0403	29186	80253	NUT,PLAIN,HEXAGON	2
86	PAFZZ	5306-01-569-1824	38151	801125-01	BOLT,MACHINE	4
87	XBFZZ		38151	723272-02	COVER,ACCESS	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
COOLING SYSTEM INSTALLATION, TG440-0001

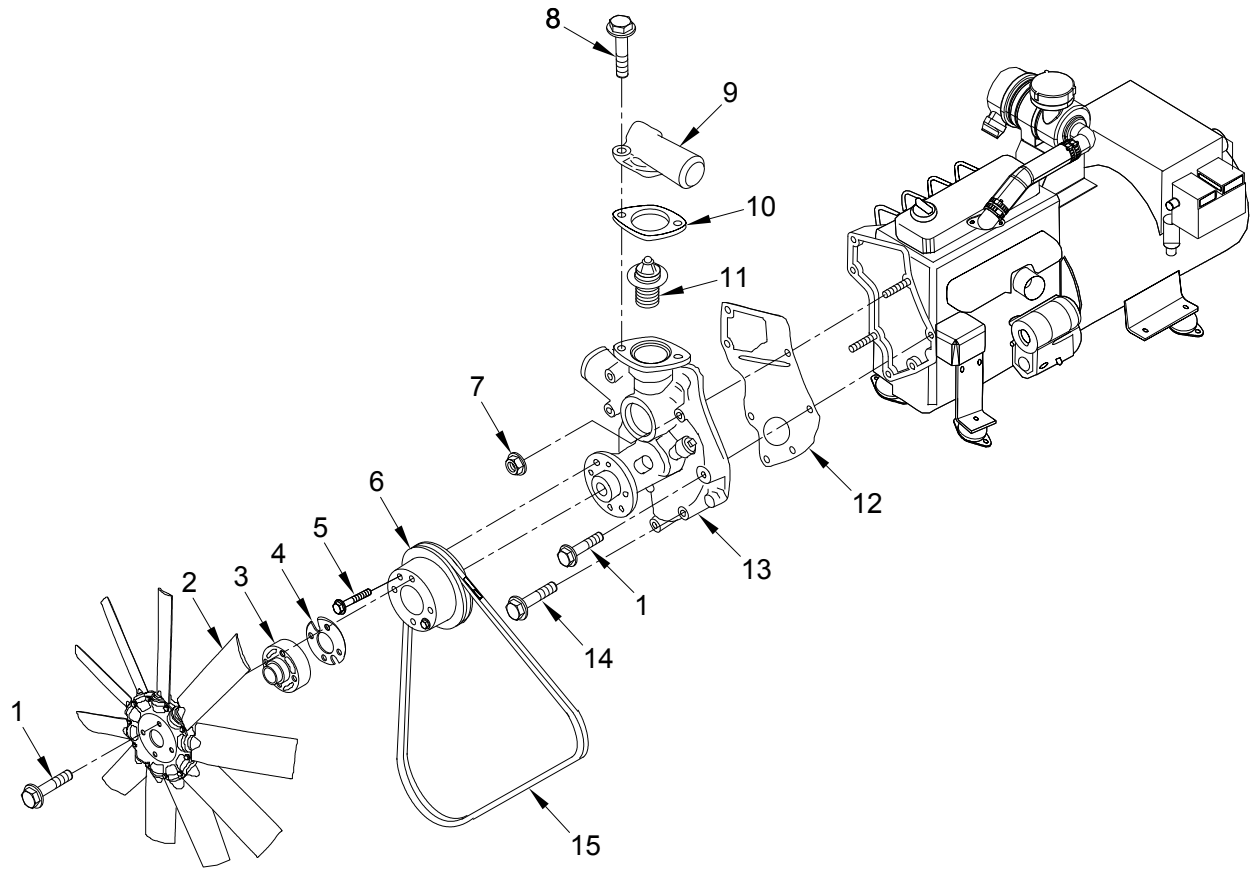


Figure 11. Cooling System Installation, TG440-0001.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
					GROUP 01020201	
					FIGURE 11 COOLING SYSTEM INSTALLATION TG440-0001	
1	PAFZZ	5306-01-552-8636	29186	0-28080845-0	BOLT,MACHINE	5
2	XBFZZ		29186	MACK913	FAN	1
3	XBFZZ		29186	9-89136423-0	SPACER	1
4	PAFZZ	5365-01-548-4417	4N530	897063-4003	SPACER,SLEEVE	1
5	PAFZZ	5306-01-570-6401	4N530	028050-6120	BOLT,MACHINE	2
6	XBFZZ		29186	8-97226855-0	PULLEY	1
7	PAFZZ	5310-01-552-8714	29186	0-91150208-0	NUT,PLAIN,EXTENDED WASHER,HEXAGON	2
8	PAFZZ	5306-01-552-8656	29186	0-28680825-0	BOLT,MACHINE	2
9	XBFZZ		29186	8-97258479-2	HOUSING,THERMOSTAT	1
10	PAFZZ	5330-01-552-4522	29186	8-97264690-1	GASKET	1
11	PAFZZ	6685-01-553-1277	29186	8-97361770-0	THERMOSTAT,FLOW CONTROL	1
12	PAFZZ	5330-01-552-9907	29186	8-97289543-0	GASKET	1
13	PAFZZ	2930-01-553-4605	29186	8-97254148-3	PUMP,COOLING SYSTEM	1
14	PAFZZ	5306-01-552-8639	29186	0-28080840-0	BOLT,MACHINE	2
15	PAFZZ	3030-01-552-5720	29186	8-97224999-0	BELT,V	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
AIR INTAKE INSTALLATION, 1003392

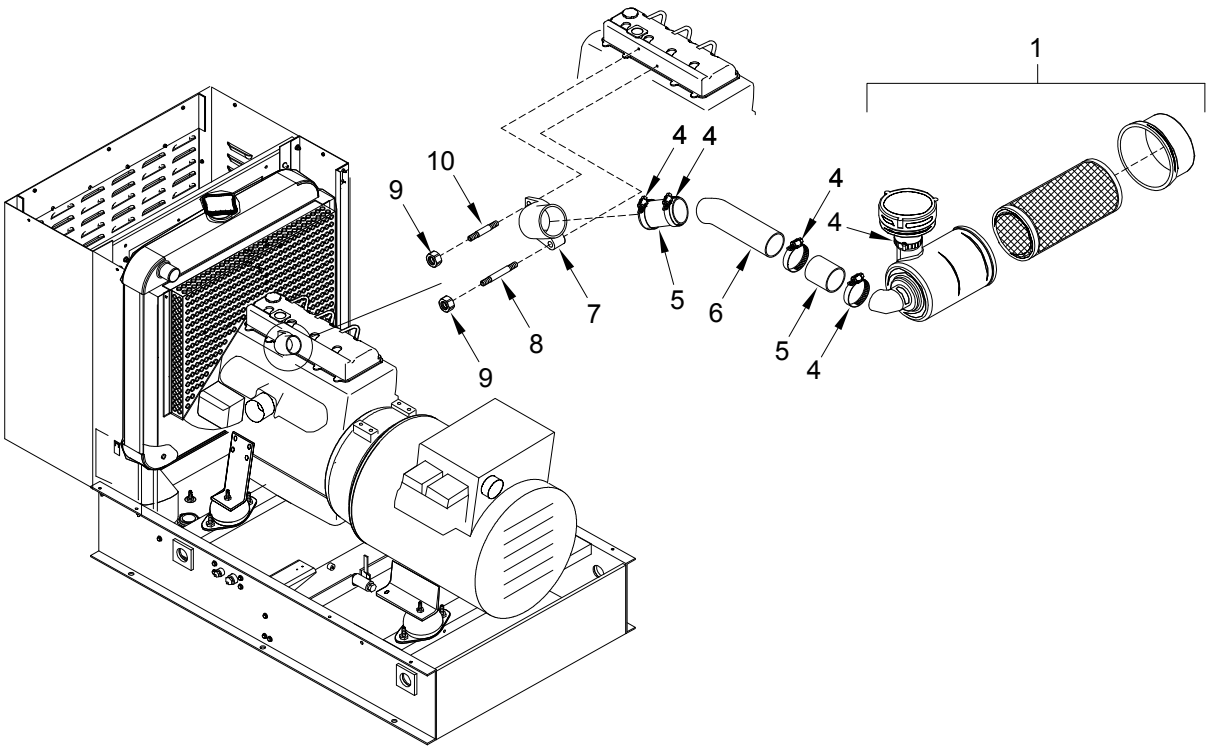


Figure 12. Air Intake Installation, 1003392.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
					GROUP 01020202	
					FIGURE 12 AIR INTAKE INSTALLATION, 1003392	
1	PAFZZ	2940-01-584-3314	4N530	X-14210-057-0	FILTER,BODY,INTAKE AIR CLEANER	1
2	PAFZZ	4310-01-552-5118	29186	MACK262	FILTER,ELEMENT,INTAKE AIR CLEANER	1
3	PAFZZ	2940-01-553-1319	29186	MACK922	AIR CLEANER,INTAKE	1
4	PAFZZ	4730-01-552-9598	29186	X-09915-004	CLAMP,HOSE	5
5	XBFZZ		29186	24032-2	EXTENSION,FLEXIBLE	2
6	XBFZZ		29186	X-14111-050-0	TUBE,INTAKE	1
7	XBFZZ		4N530	897227-6030	PIPE,ELBOW	1
8	PAFZZ		4N530	897094-6411	STUD,CONTINUOUS THREAD	1
9	PAFZZ	5310-01-570-5969	4N530	897329-6220	NUT,BLANK	2
10	PAFZZ		4N530	041010-6160	STUD,CONTINUOUS THREAD	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
RADIATOR INSTALLATION, TG421-9000

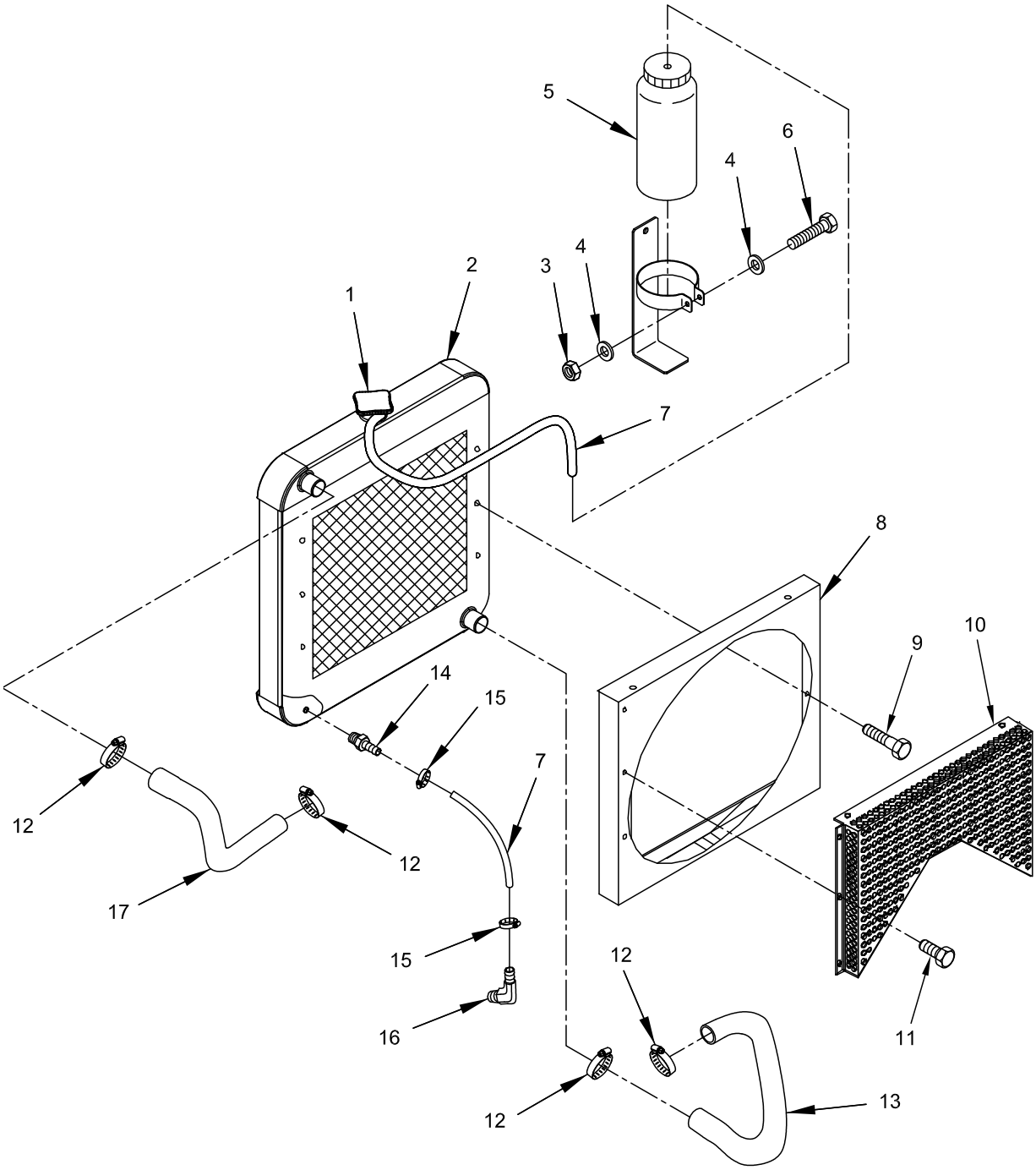


Figure 13. Radiator Installation, TG421-9000.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
					GROUP 010203	
					FIGURE 13 RADIATOR INSTALLATION TG421-9000	
1	PAFZZ	2930-01-552-6338	29186	MACK1180	CAP,FILLER OPENING	1
2	XBFZZ		29186	MACK1011	RADIATOR	1
3	PAFZZ	5310-01-552-3984	1KDE3	25CNNE1	NUT,SELF-LOCKING, HEXAGON	1
4	PAFZZ	5310-01-552-2776	1KDE3	25NWFL1	WASHER,FLAT	2
5	XBFZZ		39428	42305T47	BOTTLE,OVERFLOW	1
6	PAFZZ	5305-01-552-9209	1KDE3	25C200HCS1	SCREW,CAP,HEXAGON HEAD	1
7	XBFZZ		0WFM3	T230050	HOSE,DRAIN	2
8	XBFZZ		29186	79100204	GUARD,FAN IMPELLER	1
9	PAFZZ	5306-01-521-5240	39428	92865A535	BOLT,MACHINE	6
10	XBFZZ		29186	79600107	COVER,PROTECTIVE	1
11	PAFZZ	5305-01-559-0882	39428	92316A536	SCREW,CAP,HEXAGON HEAD	6
12	PAFZZ	4730-01-479-1934	7Z588	64010H B	CLAMP,HOSE	4
13	PAFZZ	4720-01-552-3979	29186	X892140300	HOSE,PREFORMED	1
14	PAFZZ	4730-01-552-0695	39428	5346K16	NIPPLE,HOSE	1
15	PAFZZ	4730-01-424-5432	39428	5321K14	CLAMP,HOSE	2
16	PAFZZ	4730-01-534-5870	39428	53525K14	ELBOW,PIPE TO HOSE	1
17	PAFZZ	4720-01-553-0305	29186	MACK1078	HOSE,PREFORMED	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
EXHAUST ASSEMBLY, T235005

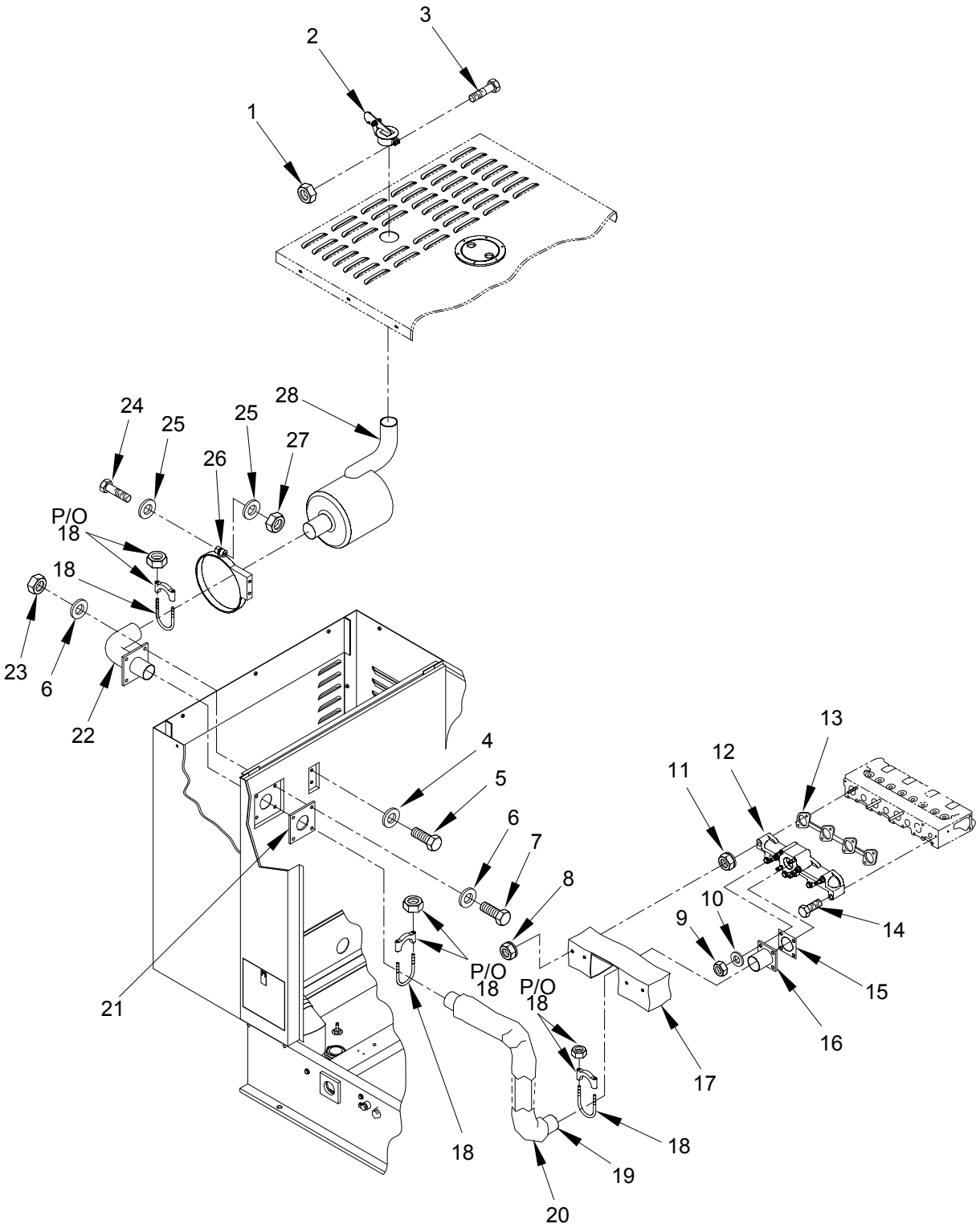


Figure 14. Exhaust Assembly, T235005.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
					GROUP 010204	
					FIGURE 14 EXHAUST ASSEMBLY T235005	
1	PAFZZ	5310-01-497-7828	39428	90257A029	NUT	1
2	XBFZZ		29186	35512	CAP,ASSEMBLY, PROTECTIVE,MUFFLER-EXHAUST PIPE	1
3	PAFZZ	5305-01-552-9209	1KDE3	25C200HCS1	SCREW,CAP,HEXAGON HEAD	1
4	PAFZZ	5310-01-552-4510	1KDE3	31NWFL1	WASHER,FLAT	2
5	PAFZZ	5305-01-553-0377	1KDE3	80C160HCS1933	SCREW,CAP,HEXAGON HEAD	2
6	PAFZZ	5310-01-552-2776	1KDE3	25NWFL1	WASHER,FLAT	8
7	PAFZZ	5305-01-552-3987	1KDE3	25C100HCS1	SCREW,CAP,HEXAGON HEAD	4
8	PAFZZ	5310-01-552-4536	39428	94800A730	PUSH ON NUT	4
9	PAFZZ	5310-01-553-2165	29186	83526	NUT,PLAIN,HEXAGON	4
10	PAFZZ	5310-01-553-0365	29186	80277	WASHER,LOCK	4
11	PAFZZ	5310-01-548-4288	4N530	091150-2080	NUT,PLAIN,EXTENDED WASHER,HEXAGON	4
12	XBFZZ	2815-01-548-4249	4N530	897117-5901	MANIFOLD,EXHAUST	1
13	PAFZZ	5330-01-480-0820	4N530	897126-1860	GASKET	1
14	PAFZZ	5306-01-547-7741	4N530	028080-8700	BOLT,SHOULDER	4
15	PAFZZ	5330-01-547-8616	4N530	897042-0280	GASKET	1
16	XBFZZ		29186	010-MACK1071	FLANGE,EXHAUST	1
17	XBFZZ		0WFM3	T231250	BLANKET,EXHAUST	1
18	PAFZZ	5340-01-552-9135	29186	MACK1047	CLAMP,LOOP	3
19	XBFZZ		29186	MACK1072	FLEX PIPE,EXHAUST	1
20	XBFZZ		E0194	1394	BLANKET,EXHAUST	1
21	XBFZZ		29186	MACK1070A	PLATE,EXHAUST	1
22	XBFZZ		29186	MACK1070	ELBOW,EXHAUST	1
23	PAFZZ	5310-01-552-3984	1KDE3	25CNNE1	NUT,SELF-LOCKING, HEXAGON	4
24	PAFZZ		39428	92198A679	SCREW,CAP,HEXAGON HEAD	1
25	PAFZZ		0Y3H3	33084	WASHER,FLAT	2
26	XBFZZ		29186	MACK930	BRACKET, MOUNTING	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
27	PAFZZ	5310-01-559-1648	1KDE3	43CNNE1	NUT,SELF-LOCKING, HEXAGON	1
28	PAFZZ	2990-01-553-0029	29186	MACK932	MUFFLER,EXHAUST	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
CONTROL PANEL ASSEMBLY, T225453

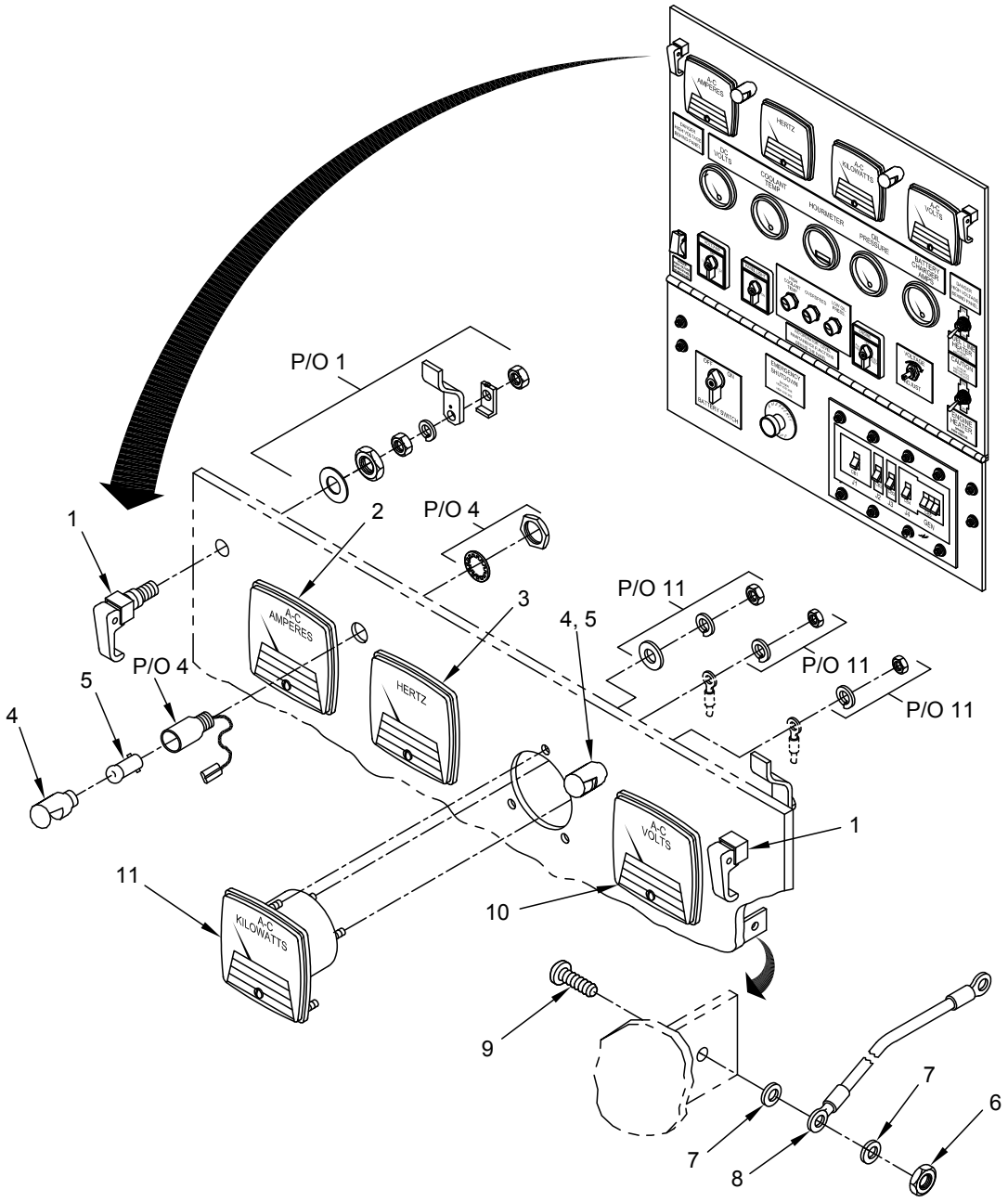


Figure 15. Control Panel Assembly, T225453 (Sheet 1 of 4).

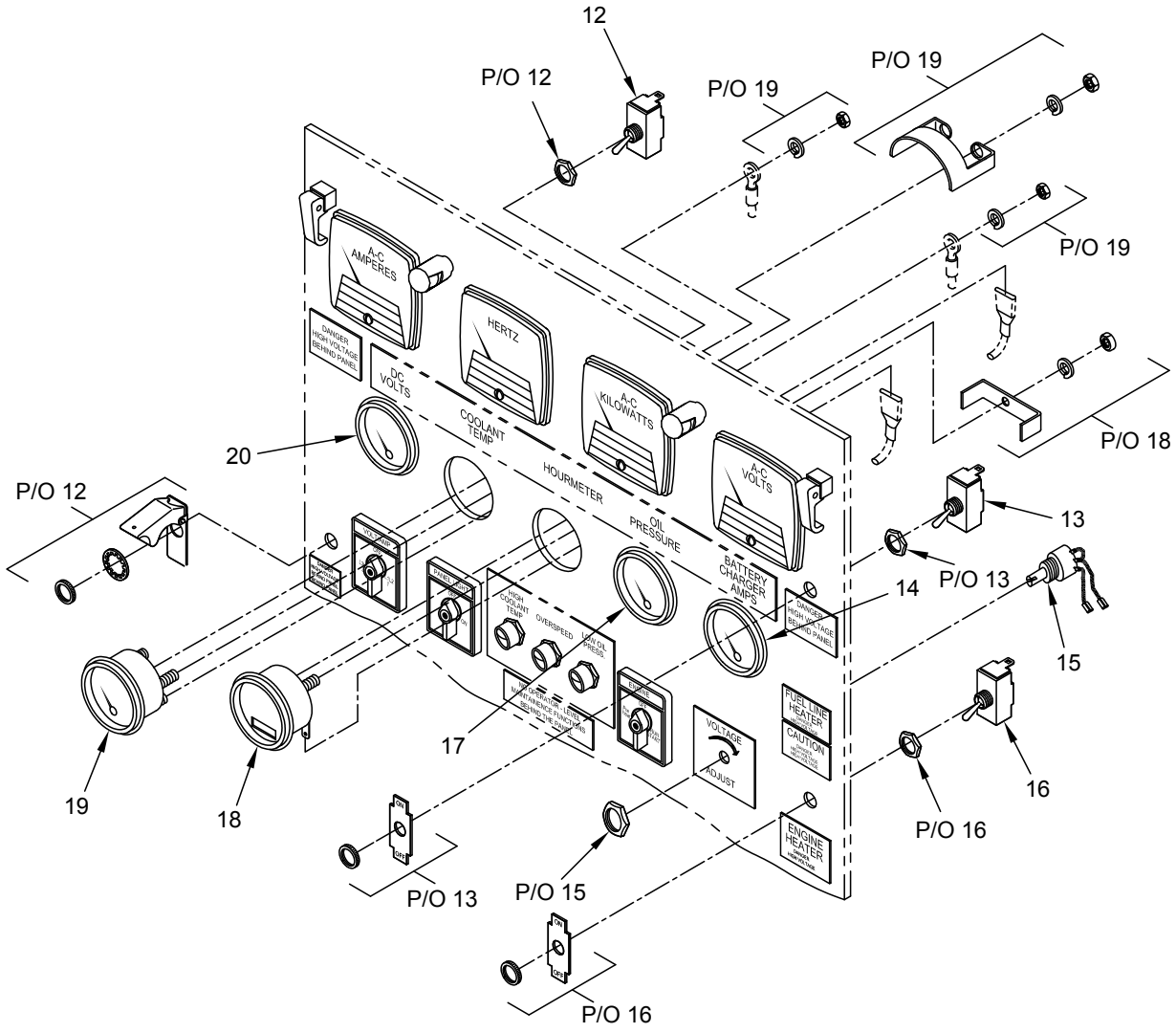


Figure 15. Control Panel Assembly, T225453 (Sheet 2 of 4).

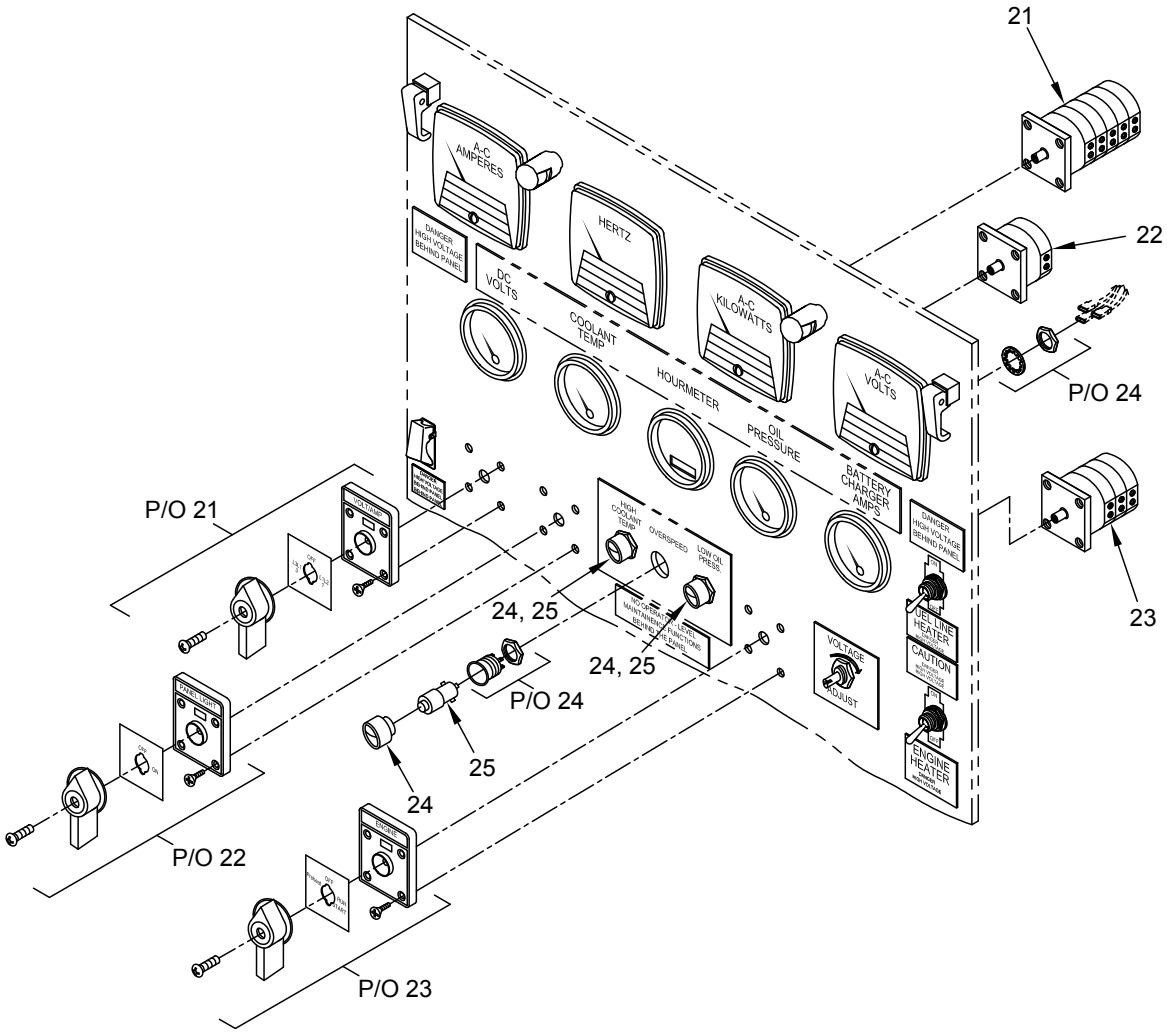


Figure 15. Control Panel Assembly, T225453 (Sheet 3 of 4).

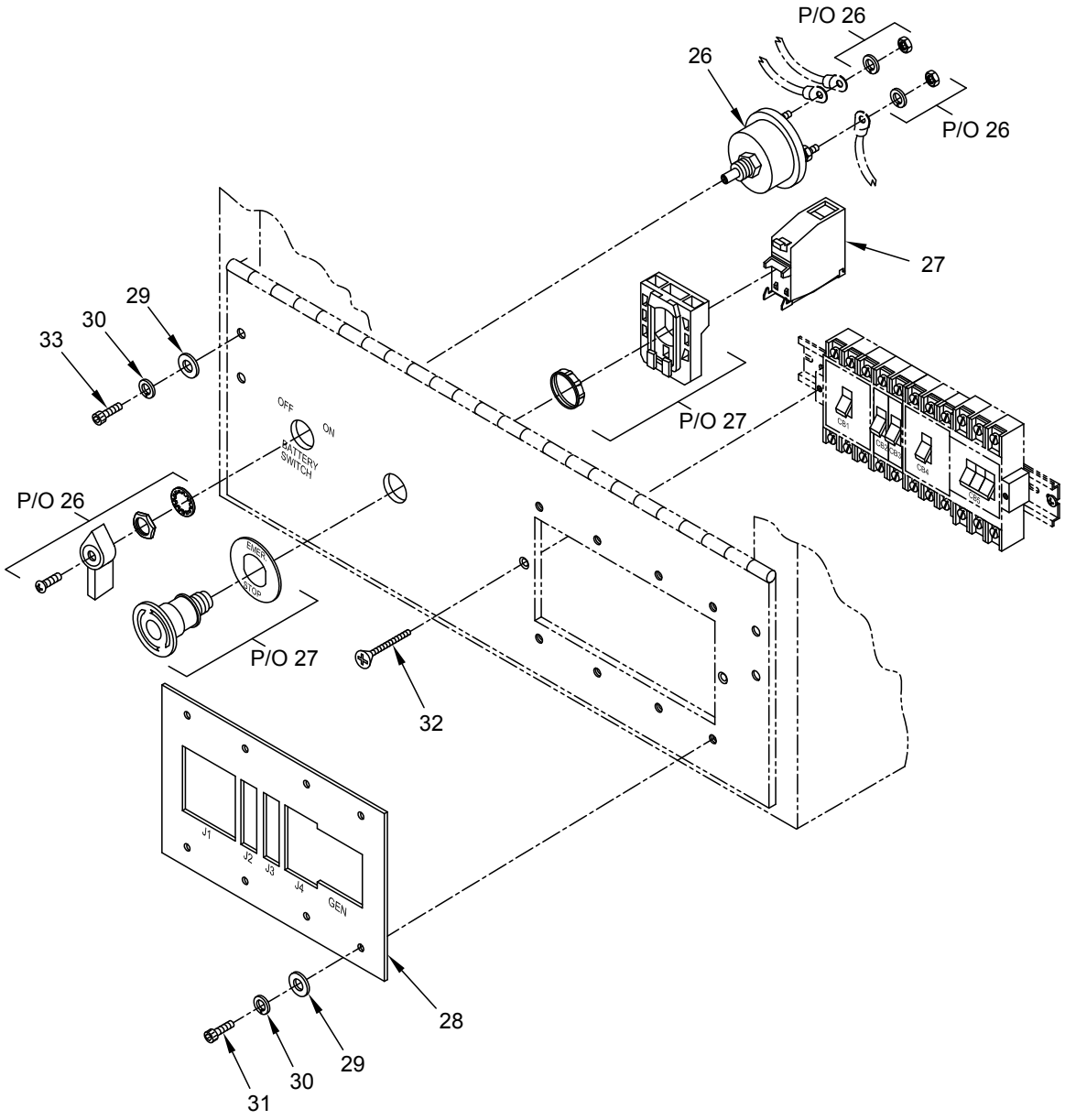


Figure 15. Control Panel Assembly, T225453 (Sheet 4 of 4).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010205	
					FIGURE 15 CONTROL PANEL ASSEMBLY, T225453	
1	PAFZZ	5340-01-552-2466	94222	62-10-35	FASTENER,PAWL	2
2	PAFZZ	6625-01-567-9791	32AV2	50365A100A	AMMETER	1
3	PAFZZ	6625-01-569-3217	32AV2	5036HZ5565	METER,ELECTRICAL FREQUENCY	1
4	PAFZZ	6210-00-643-0339	13445	DL21	LIGHT,PANEL	2
5	PAFZZ	6240-00-019-3093	58536	AA52463-A09	LAMP,INCANDESCANT	2
6	PAFZZ	5310-01-569-1792	1KDE3	8CNFH1	NUT,PLAIN,HEXAGON	2
7	PAFZZ	5310-01-553-0370	1KDE3	8NWFL1	WASHER,FLAT	4
8	PAFZZ	4010-01-553-2369	39428	30345T4	WIRE ROPE ASSEMBLY, SINGLE LEG	2
9	PAFZZ	5305-01-568-4710	0WFM3	T270130	SCREW,MACHINE	2
10	PAFZZ	6625-01-569-3262	32AV2	5036300V	VOLTMETER	1
11	PAFZZ	6625-01-569-7929	32AV2	50351MA-0-30KW	WATTMETER	1
12	PAFZZ	5930-01-569-0257	OWFM3	T260487	SWITCH,TOGGLE	1
13	PAFZZ	5930-01-569-5312	47886	D30161-1584	SWITCH,TOGGLE	1
14	PAFZZ	6625-01-567-9749	1AS48	102480	AMMETER	1
15	PAFZZ	5895-01-569-2664	3SUZ0	753-5147	SWITCH,ELECTRONIC	1
16	PAFZZ	5930-01-569-1334	47886	0737R	SWITCH,TOGGLE	1
17	PAFZZ	6620-01-569-3313	1AS48	101574	INDICATOR,PRESSURE	1
18	PAFZZ	6645-01-263-9434	16476	100222	METER,TIME TOTALIZING	1
19	PAFZZ	6625-01-569-2369	16476	101586	METER,SPECIAL SCALE	1
20	PAFZZ	6625-01-569-2419	1AS48	100184	VOLTMETER	1
21	PAFZZ	5895-01-569-3150	10983	CA11US6512-600E	SWITCH,ELECTRONIC	1
22	PAFZZ	5895-01-569-3119	10983	CA11A204-600E	SWITCH,ELECTRONIC	1
23	PAFZZ	5895-01-569-3179	10983	CA11US6522-600E	SWITCH,ELECTRONIC	1
24	PAFZZ	6210-00-686-4999	96906	MS25331-2	LIGHT,INDICATOR	3
25	PAFZZ	6240-01-552-6210	3FXU2	197-DP-287-FT28V DC	LAMP,INCANDESCENT	3
26	PAFZZ	5930-01-330-2858	30003	1771AS661-1	SWITCH,ROTARY	1
27	PAFZZ	5930-01-569-0283	1RW76	XB5AS8445GCF	SWITCH,PUSH-PULL	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
28	XBFZZ		0WFM3	T220034-1	PLATE,MOUNTING.....	1
29	PAFZZ	5310-01-555-7064	1KDE3	10DWFL10	WASHER,FLAT	12
30	PAFZZ	5310-01-555-6402	1KDE3	10DLOC1	WASHER,LOCK	12
31	PAFZZ	5305-01-567-1777	1KDE3	10C50MXP10	SCREW,MACHINE.....	8
32	PAFZZ	5305-01-569-1758	39428	91771A207	SCREW,MACHINE.....	2
33	PAFZZ	5305-01-569-1782	1KDE3	10C125MXP10	SCREW,MACHINE.....	4
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
POWER DISTRIBUTION PANEL ASSEMBLY, T225853

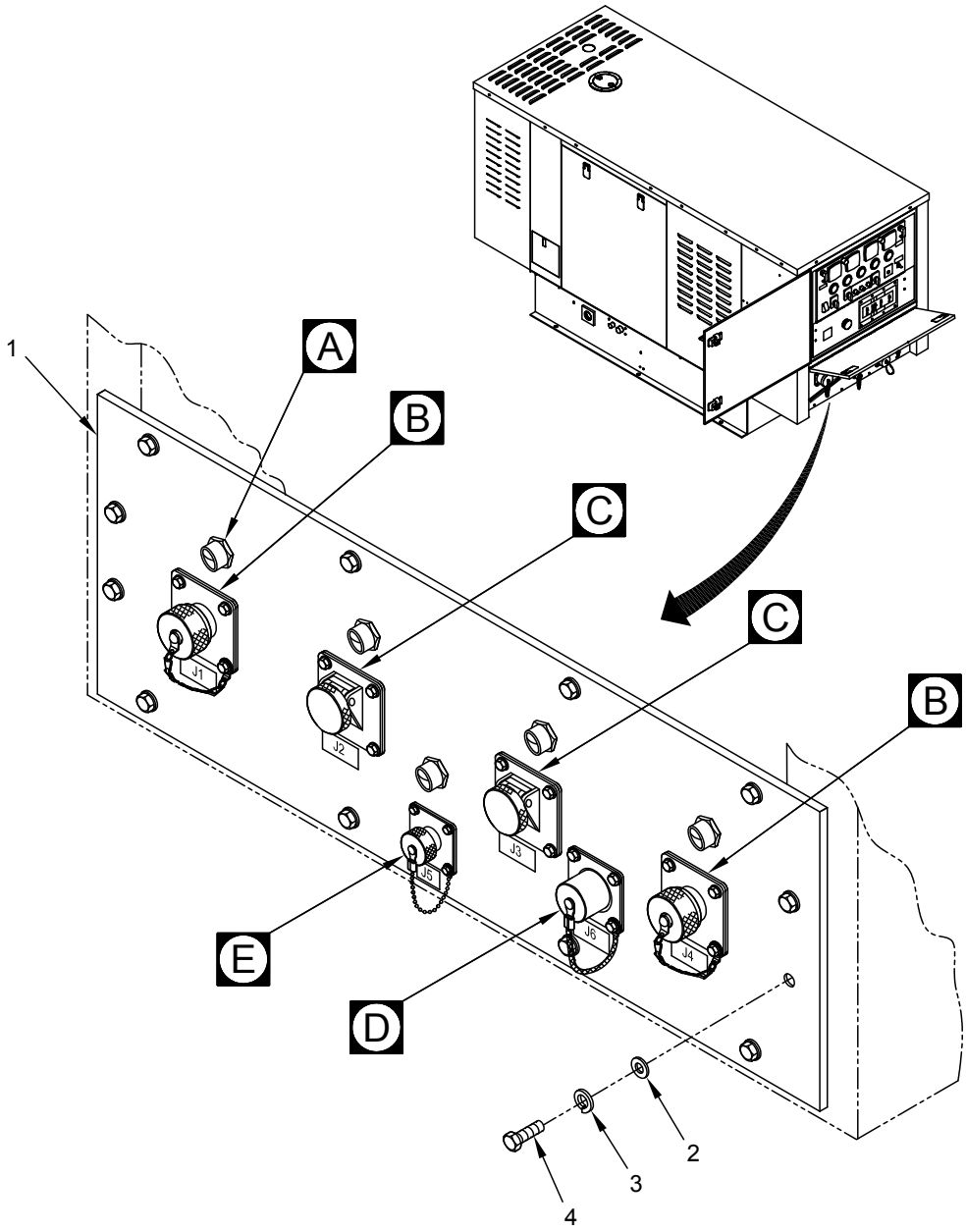


Figure 16. Power Distribution Panel Assembly, T225853 (Sheet 1 of 4).

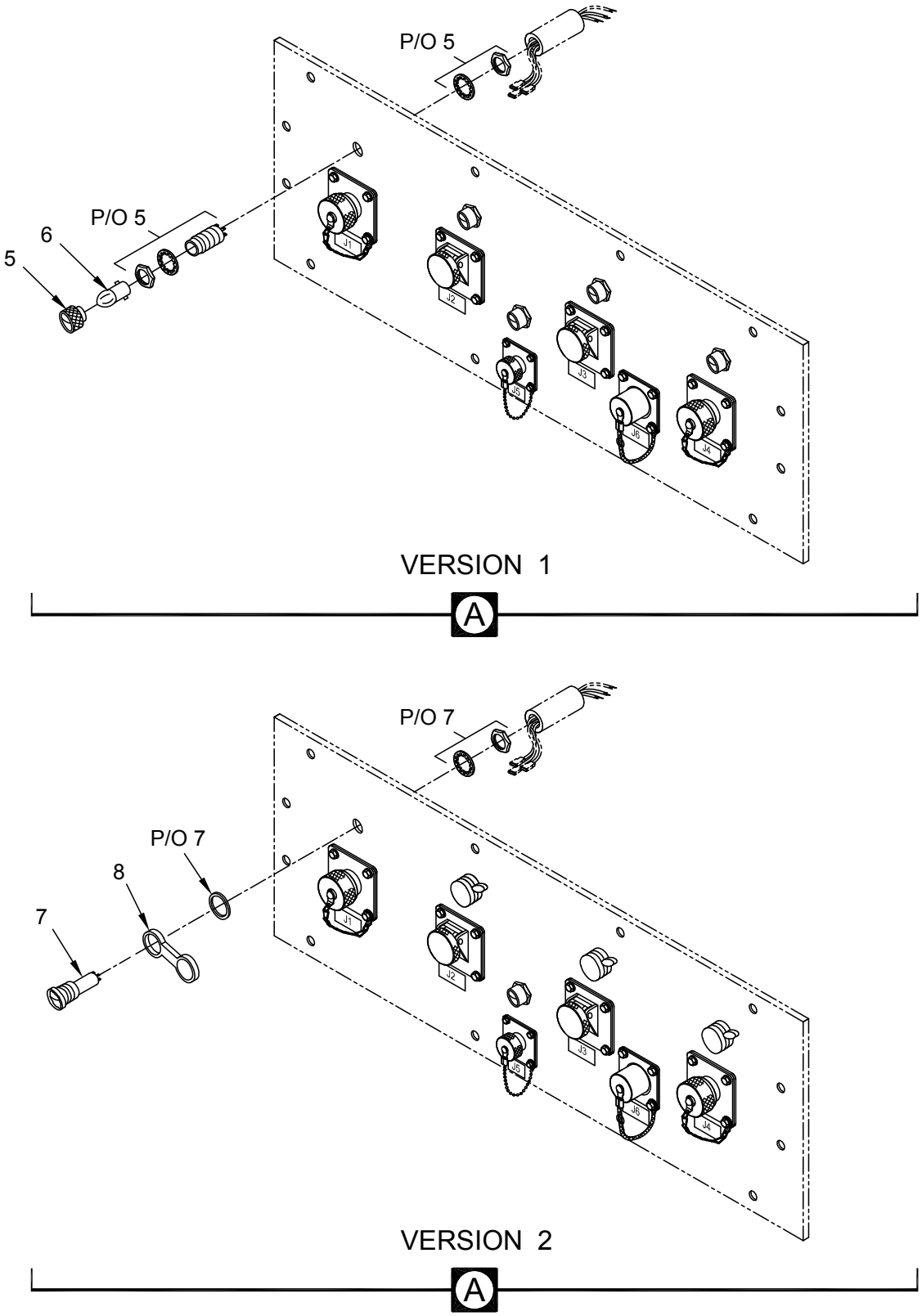


Figure 16. Power Distribution Panel Assembly, T225853 (Sheet 2 of 4).

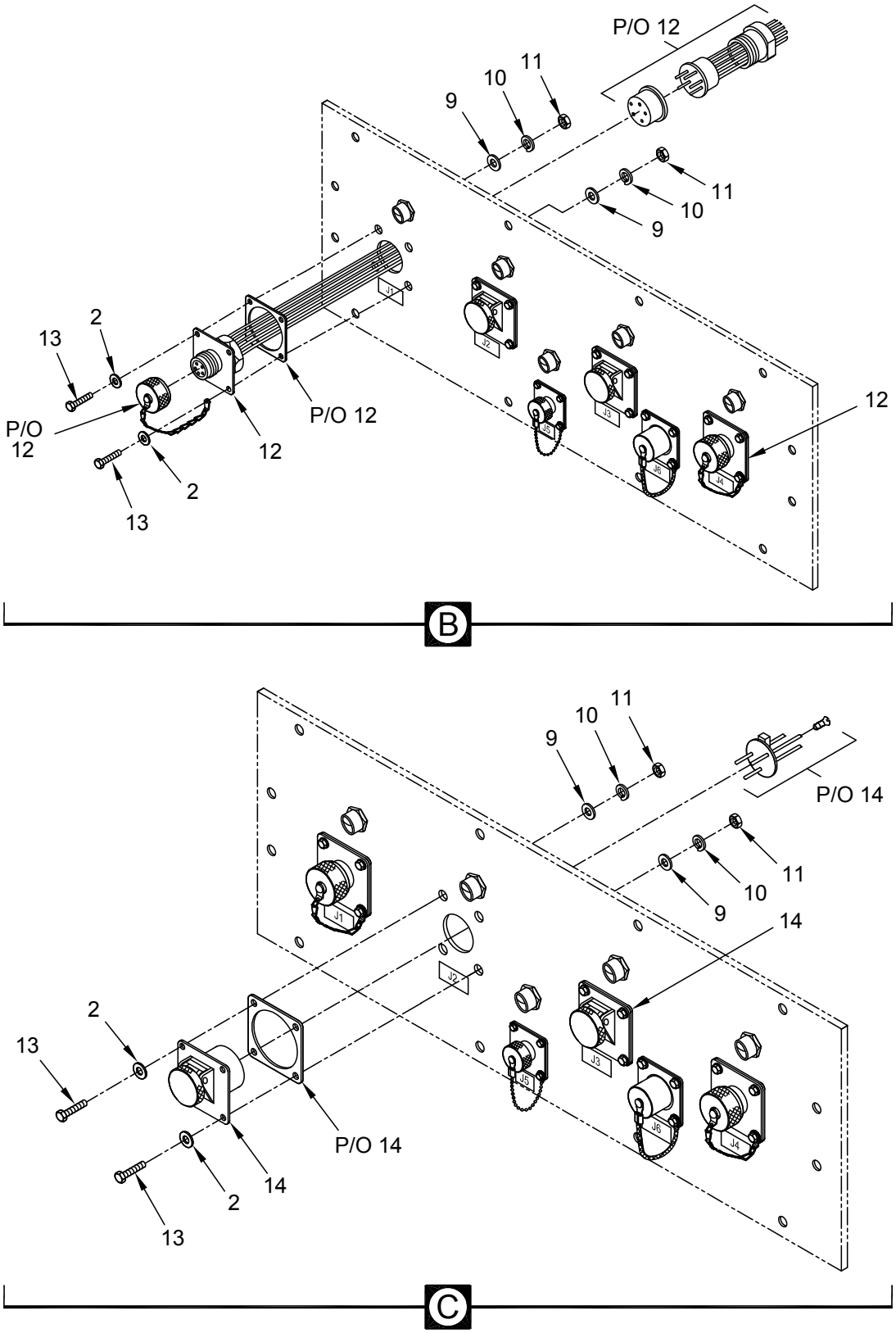


Figure 16. Power Distribution Panel Assembly, T225853 (Sheet 3 of 4).

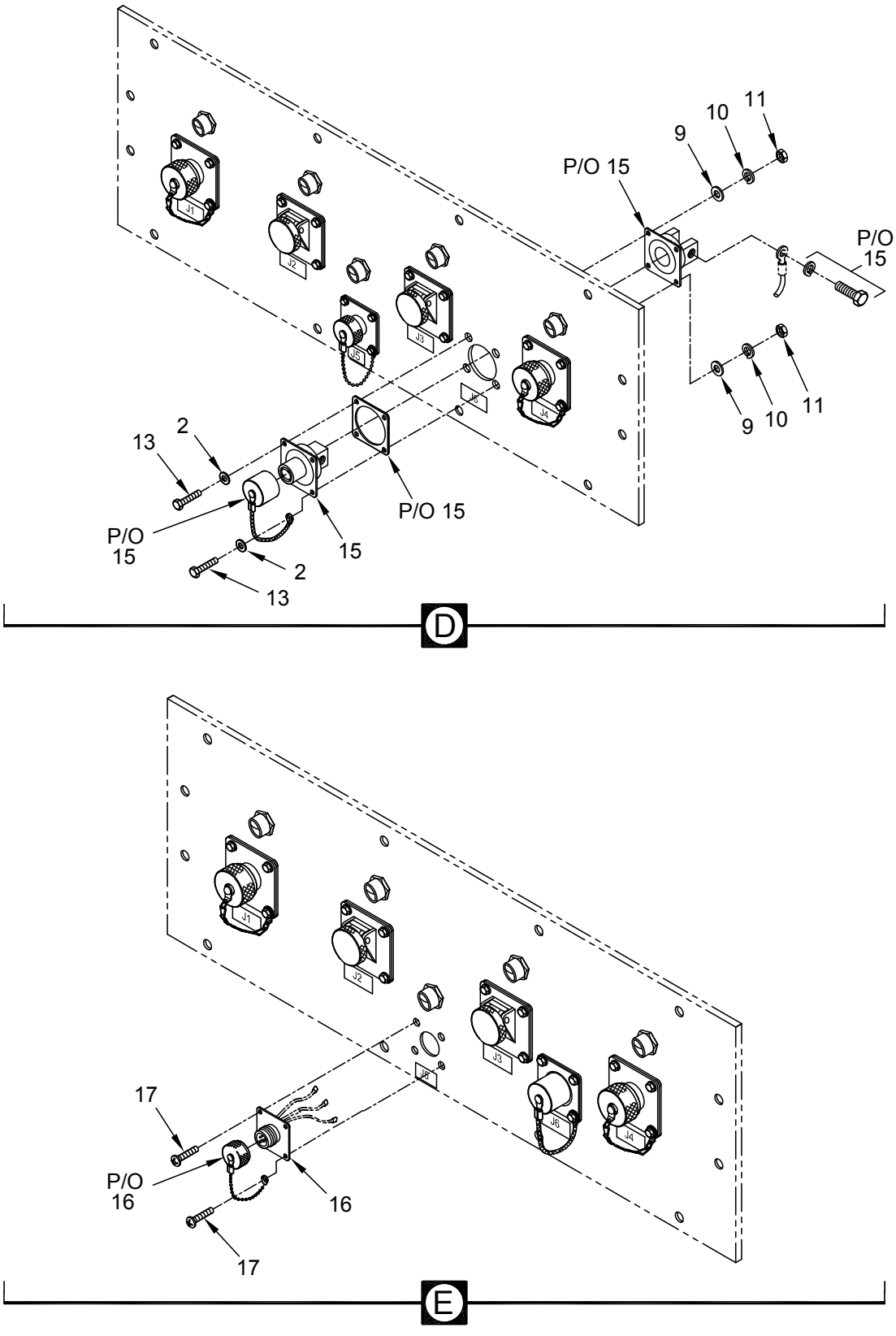


Figure 16. Power Distribution Panel Assembly, T225853 (Sheet 4 of 4).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010206	
					FIGURE 16 POWER DISTRIBUTION PANEL ASSEMBLY, T225853	
1	XBFZZ		0WFM3	T220035-1	PANEL,ELECTRICAL EQUIPMENT	1
2	PAFZZ	5310-01-555-7064	1KDE3	10DWFL10	WASHER,FLAT	44
3	PAFZZ	5310-01-569-0373	1KDE3	10DLOC10	WASHER,LOCK	24
4	PAFZZ	5305-01-558-7195	1KDE3	10C75HCS10	SCREW,CAP,HEXAGON HEAD	12
5	PAFZZ	6210-01-108-2600	96906	MS25331-4	LIGHT,INDICATOR	5
6	PAFZZ	6240-01-552-5498	3FXU2	197-DP-1207-FT120VAC	LAMP ASSEMBLY	5
7	PAFZZ		C4647	19411132M	LAMP ASSEMBLY	5
8	PAFZZ		0WFM3	1009000	COVER,BLACKOUT INDICATOR	5
9	PAFZZ	5310-01-552-4523	1KDE3	10DWFL1	WASHER,FLAT	20
10	PAFZZ	5310-01-555-6402	1KDE3	10DLOC1	WASHER,LOCK	20
11	PAFZZ	5310-01-569-1766	1KDE3	10CNFH1	NUT,LOCKING	20
12	PAFZZ	5935-01-569-4429	0PCR1	CD90555C32412S	CONNECTOR, RECEPTACLE, ELECTRICAL	2
13	PAFZZ	5305-01-553-0345	1KDE3	10C100HCS10	SCREW,CAP,HEXAGON HEAD	20
14	PAFZZ	5935-01-569-0794	7Y971	519316	CONNECTOR,RECEPTACLE, ELECTRICAL	2
15	PAFZZ	5935-01-097-9974	19207	11674728	CONNECTOR,RECEPTACLE, ELECTRICAL	1
16	PAFZZ	5935-01-568-9835	3SUZ0	605-3008	CONNECTOR,RECEPTACLE, ELECTRICAL	1
17	PAFZZ	5305-01-569-1811	1KDE3	4C37MP10	SCREW,MACHINE	4
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
BARRIER PANEL ASSEMBLY, T225250-5

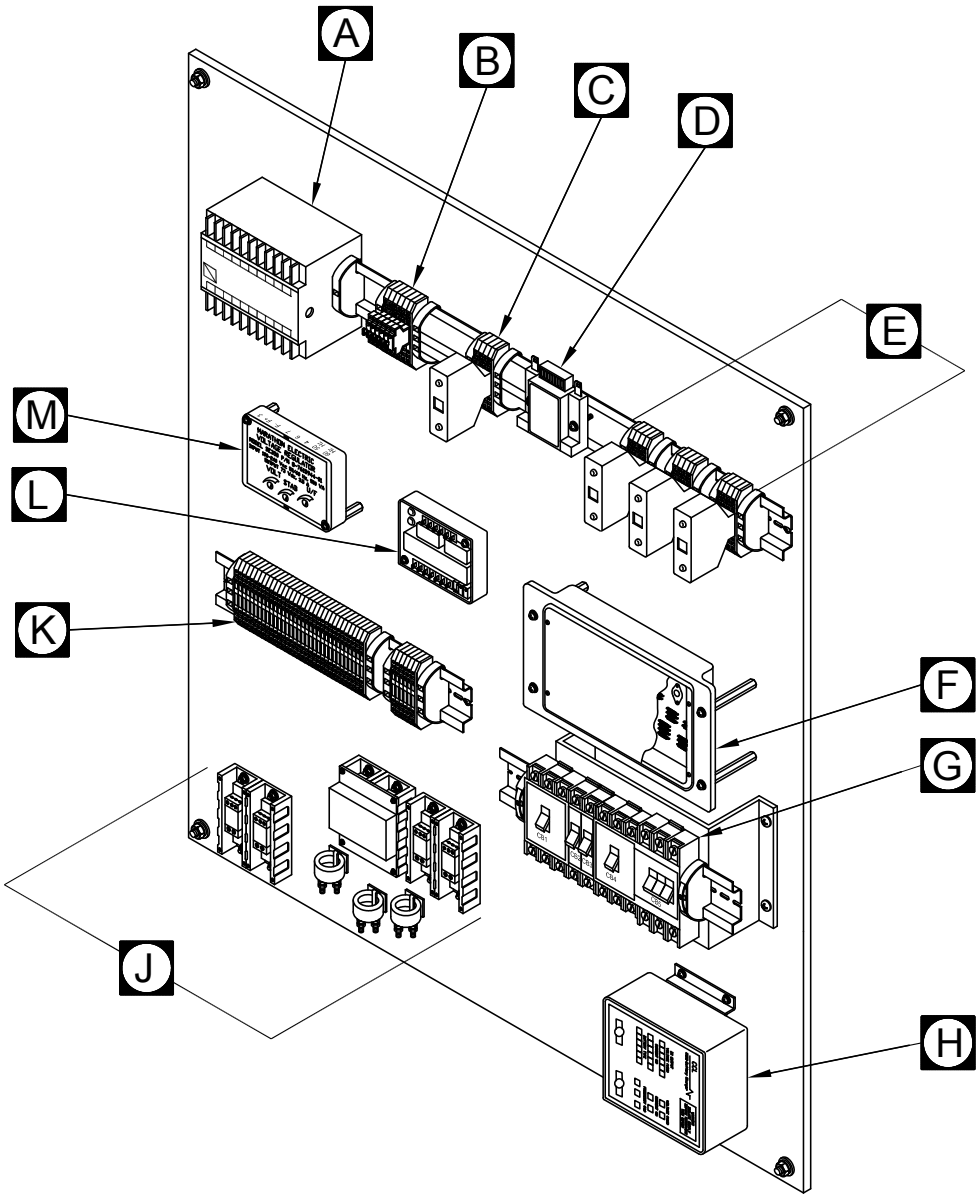


Figure 17. Barrier Panel Assembly, T225250-5 (Sheet 1 of 7).

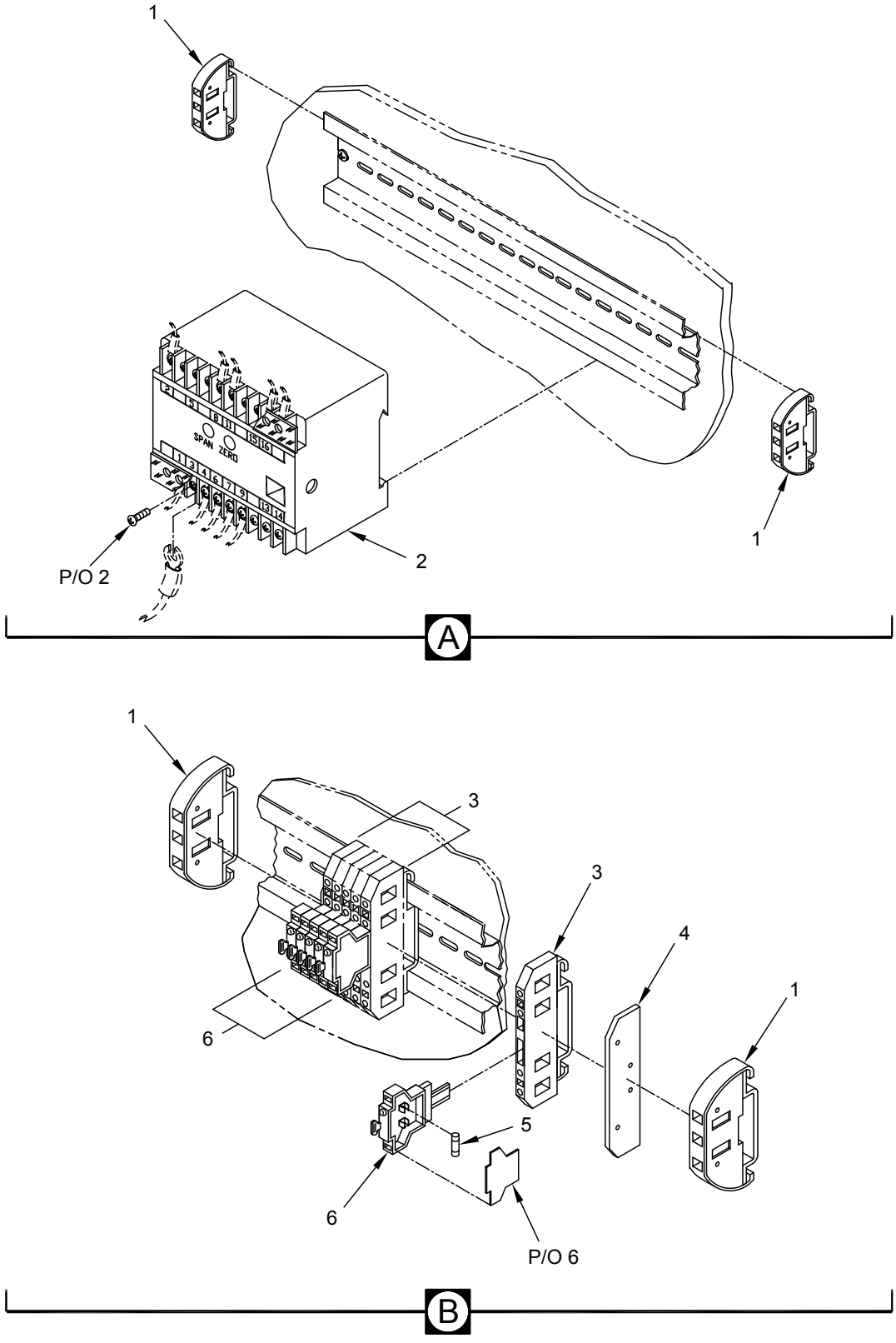


Figure 17. Barrier Panel Assembly, T225250-5 (Sheet 2 of 7).

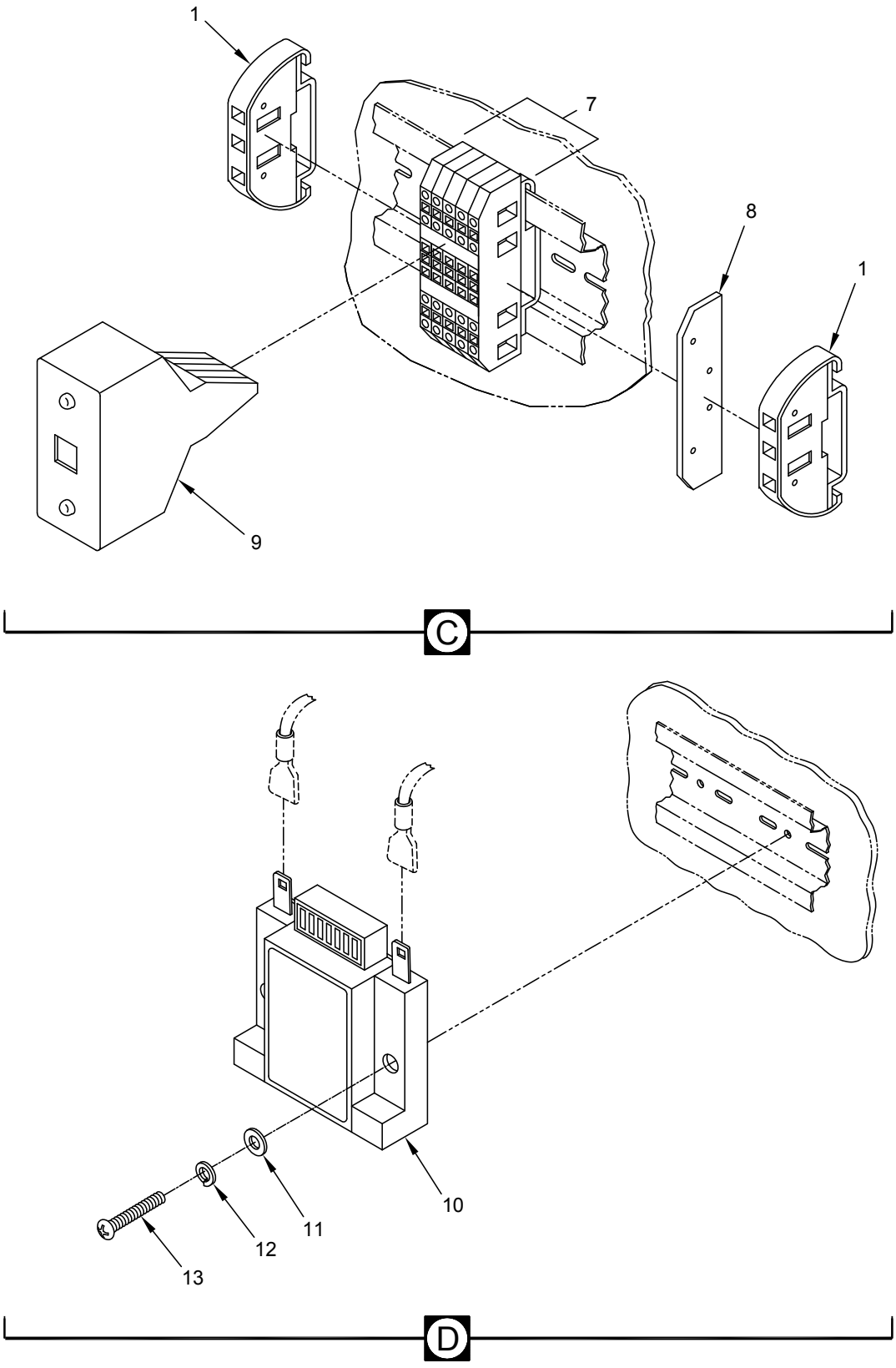


Figure 17. Barrier Panel Assembly, T225250-5 (Sheet 3 of 7).

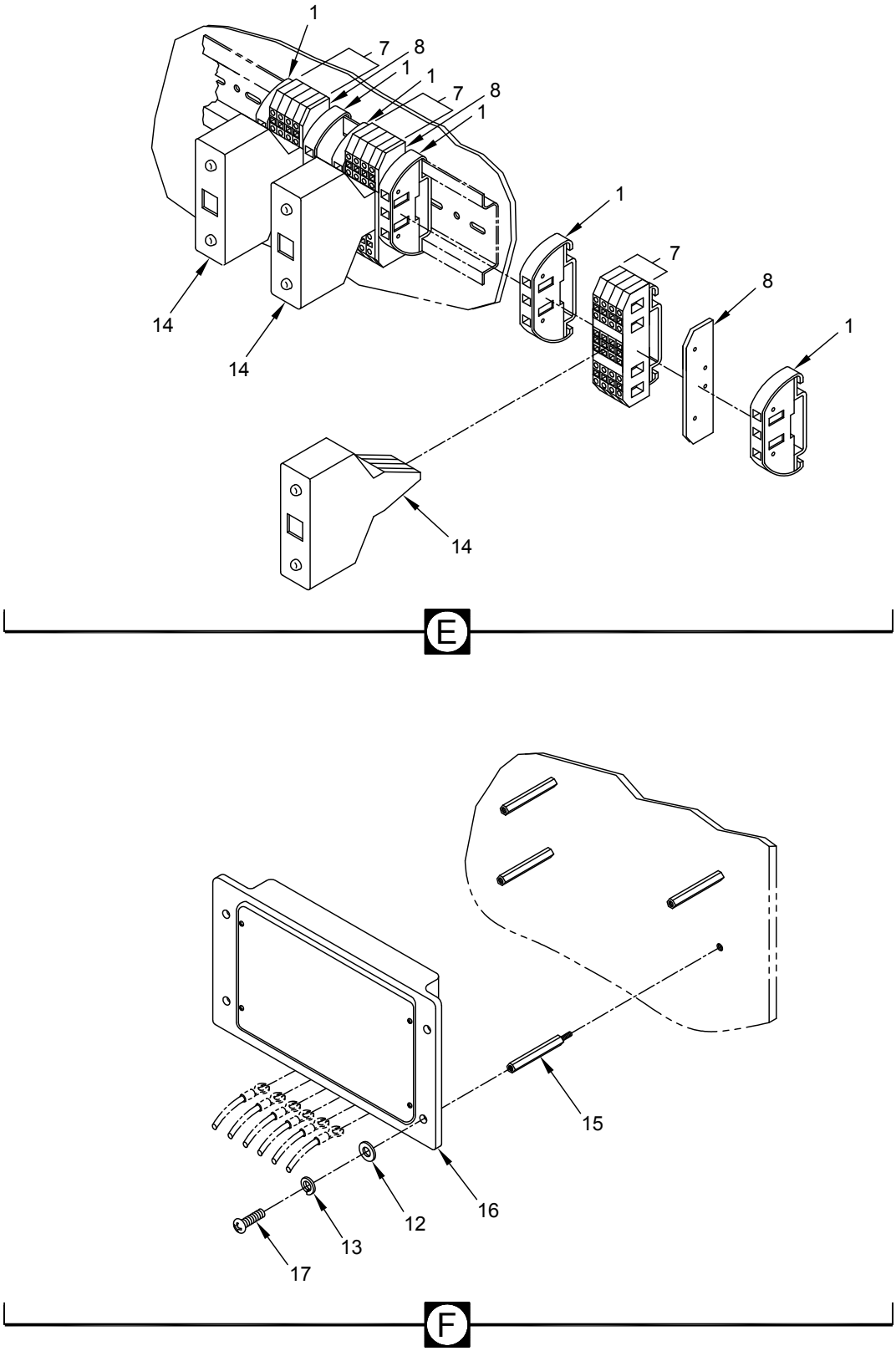


Figure 17. Barrier Panel Assembly, T225250-5 (Sheet 4 of 7).

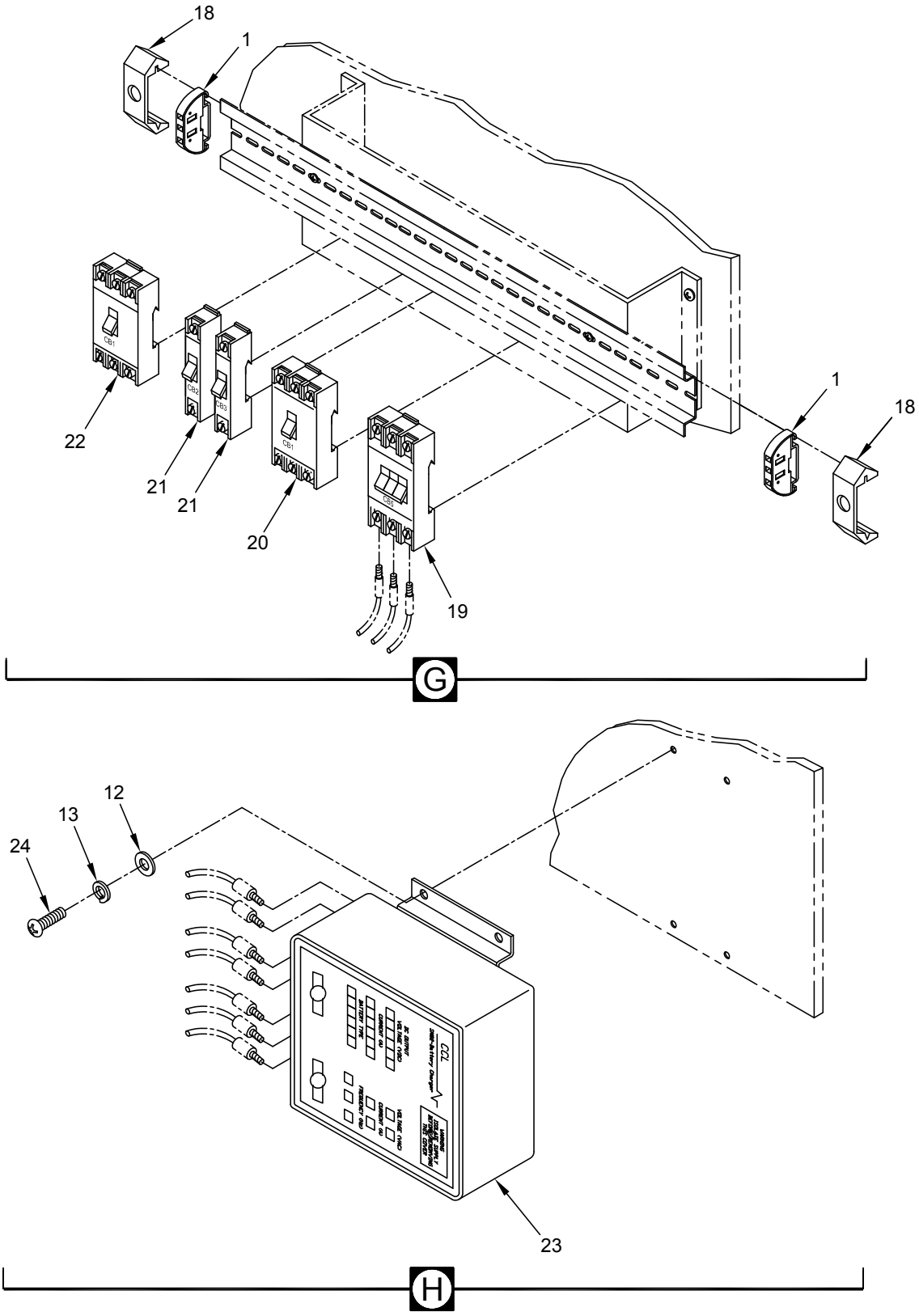


Figure 17. Barrier Panel Assembly, T225250-5 (Sheet 5 of 7).

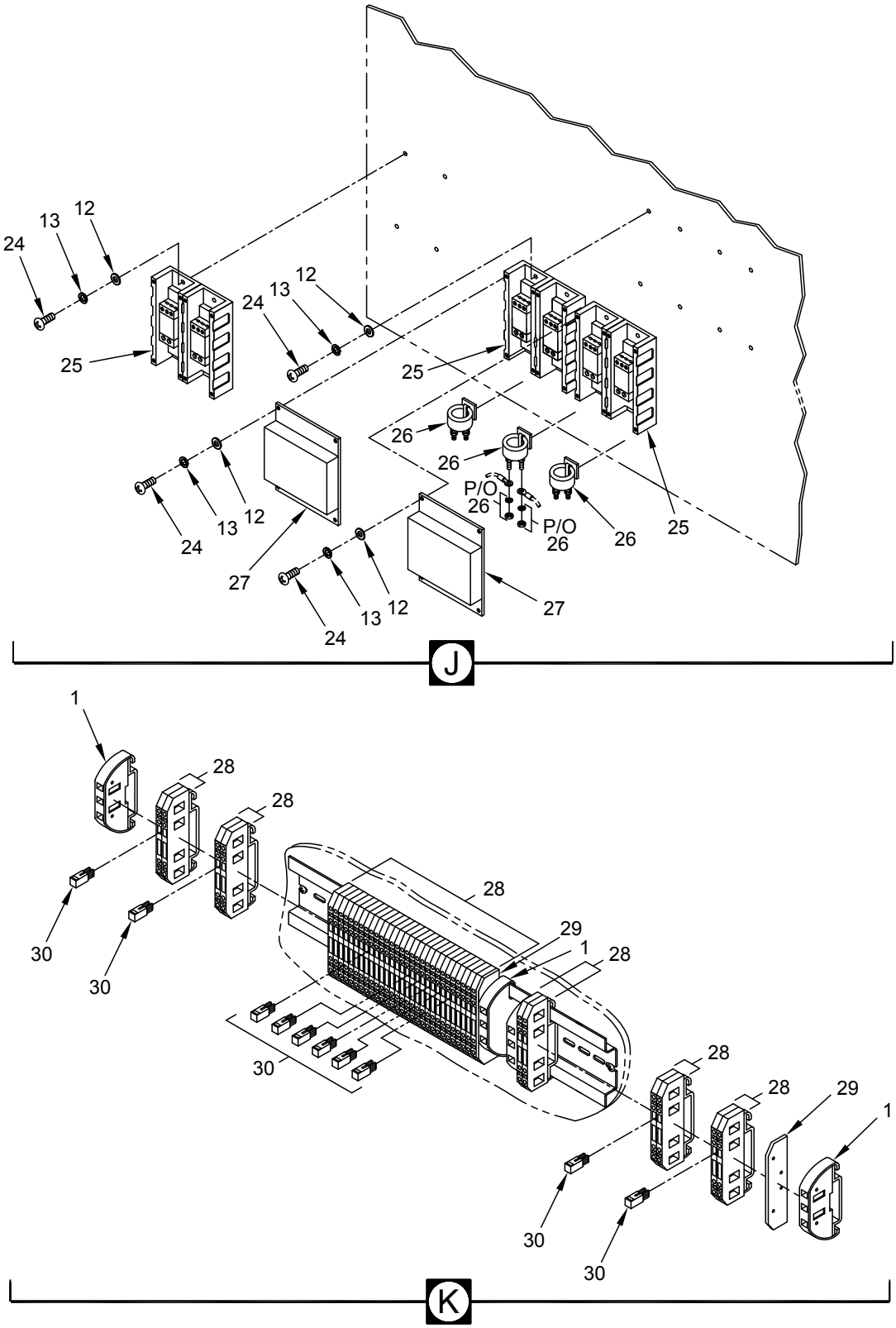


Figure 17. Barrier Panel Assembly, T225250-5 (Sheet 6 of 7).

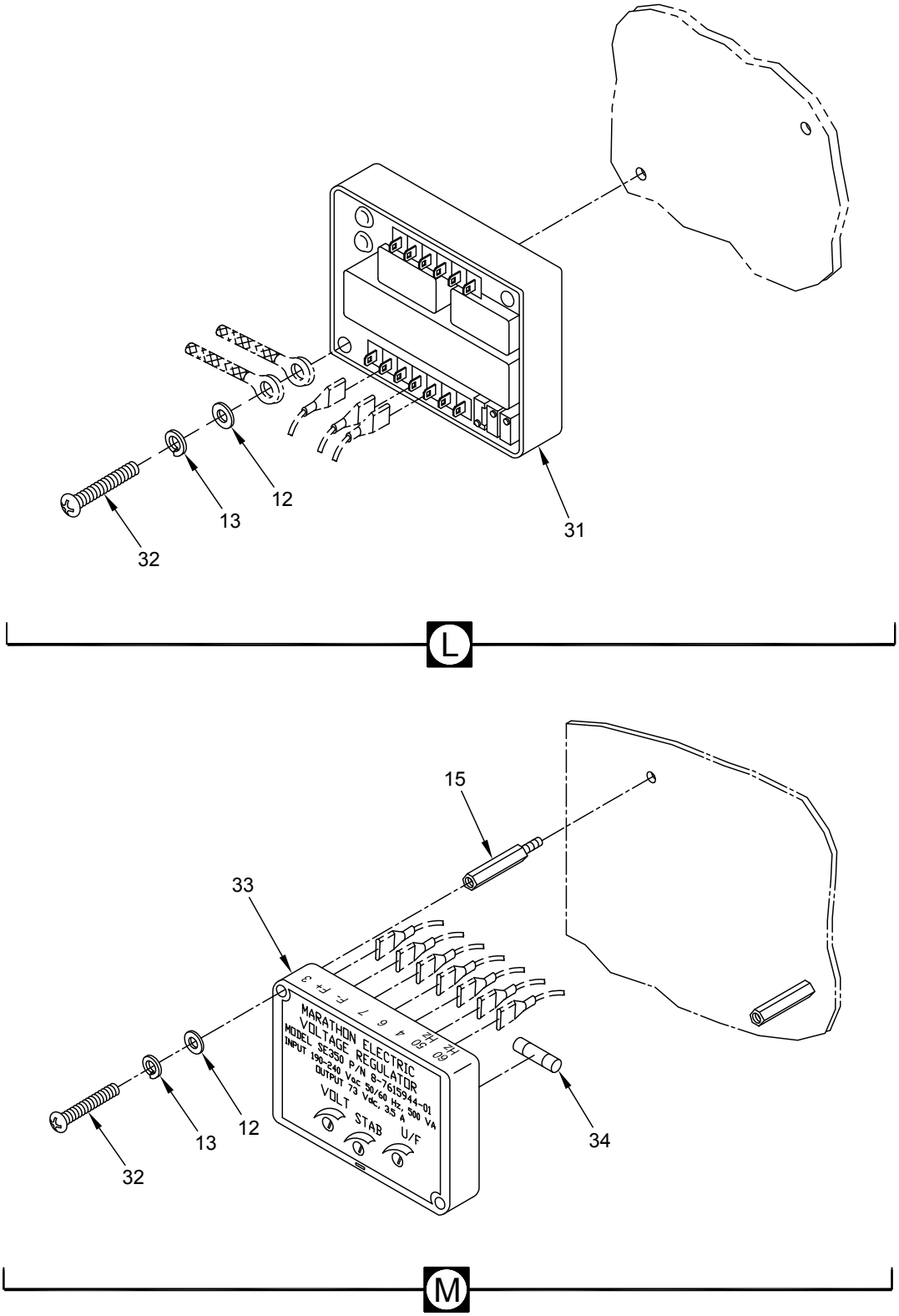


Figure 17. Barrier Panel Assembly, T225250-5 (Sheet 7 of 7).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010207	
					FIGURE 17 BARRIER PANEL ASSEMBLY, T225250-5	
1	PAFZZ	5340-99-519-4305	K6F01	249-116	END STOP	18
2	PAFZZ	5963-01-569-0378	32AV2	M100-WA5	ELECTRONIC MODULE, STANDARDIZED	1
3	PAFZZ	2920-99-690-7498	K6F01	281-610	TERMINAL BLOCK	6
4	PAFZZ		K6F01	281-326	PLATE,MOUNTING	1
5	PAFZZ	5920-01-327-2572	71400	GMC-4A	FUSE,CARTRIDGE	6
6	PAFZZ	5920-01-480-3209	65996	281-512	FUSE,PLUG	6
7	PAFZZ	2920-99-983-9545	K6F01	280-610	TERMINAL BLOCK	17
8	PAFZZ		K6F01	280-326	PLATE,MOUNTING	4
9	PAFZZ	5945-99-360-1748	K6F01	286-555	SWITCH,ELECTRONIC	1
10	PAFZZ	5999-01-113-0824	0AGK2	438USA	DELAY LINE	1
11	PAFZZ	5310-01-553-0370	1KDE3	8NWFL1	WASHER,FLAT	34
12	PAFZZ	5310-01-569-4411	1KDE3	8NLOC1	WASHER,LOCK	34
13	PAFZZ	5305-01-569-7811	1KDE3	8C125MXP1	SCREW,MACHINE	2
14	PAFZZ	5945-99-598-7263	K6F01	286-320	RELAY,SWITCH……..	3
15	PAFZZ	5340-01-569-5498	39428	92700A459	STANDOFF,THREADED, SNAP-IN	2
16	PAFZZ	6110-01-569-1448	29186	010-9336	CONTROLLER,MOTOR	1
17	PAFZZ	5305-01-569-1803	1KDE3	8C75MXP1	SCREW,MACHINE	4
18	PAFZZ		0WFM3	T260605	BRACKET,MOUNTING	2
19	PAFZZ	5929-01-569-0391	1RW76	MG27186	CIRCUIT BREAKER	1
20	PAFZZ	5925-01-043-9283	56303	QOU330	CIRCUIT BREAKER	1
21	PAFZZ	5925-01-040-7979	56303	QOU120	CIRCUIT BREAKER	2
22	PAFZZ	5925-01-569-0297	56303	QOU360	CIRCUIT BREAKER	1
23	PAFZZ	6130-01-569-2725	32AV2	SM82243ELACF PC	POWER SUPPLY	1
24	PAFZZ	5305-01-568-4710	0WFM3	T270130	SCREW,MACHINE	24
25	PAFZZ	5940-01-568-9122	005K5	16325-2	TERMINAL BLOCK	3
26	PAFZZ	5930-01-569-0337	32AV2	546-100-00T	TRANSFORMER,CURRENT	3
27	XBFZZ		7Y971	CPBD-2	COVER,PROTECTIVE	2
28	PAFZZ	5940-01-528-7120	65996	281-901	TERMINAL JUCTION BLOCK, SECTION A	39
29	PAFZZ		K6F01	281-329	PLATE,MOUNTING	2
30	PAFZZ	5940-01-349-6763	65996	281-402	JUMPER,ELECTRICAL, SPECIAL	10

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
31	PAFZZ	5895-01-569-1469	1PMV3	DYN3-60030	SWITCH,ELECTRONIC	1
32	PAFZZ	5305-01-569-7744	1KDE3	8C100MXP1	SCREW,MACHINE.....	4
33	PAFZZ	6110-01-533-9768	38151	SE350	VOLTAGE REGULATOR SUBASSEMBLY	1
34	PAFZZ	5920-01-285-9879	75915	218004	FUSE,CARTRIDGE…….	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
CHASSIS, TRAILER ASSEMBLY, T215125G/T215125T

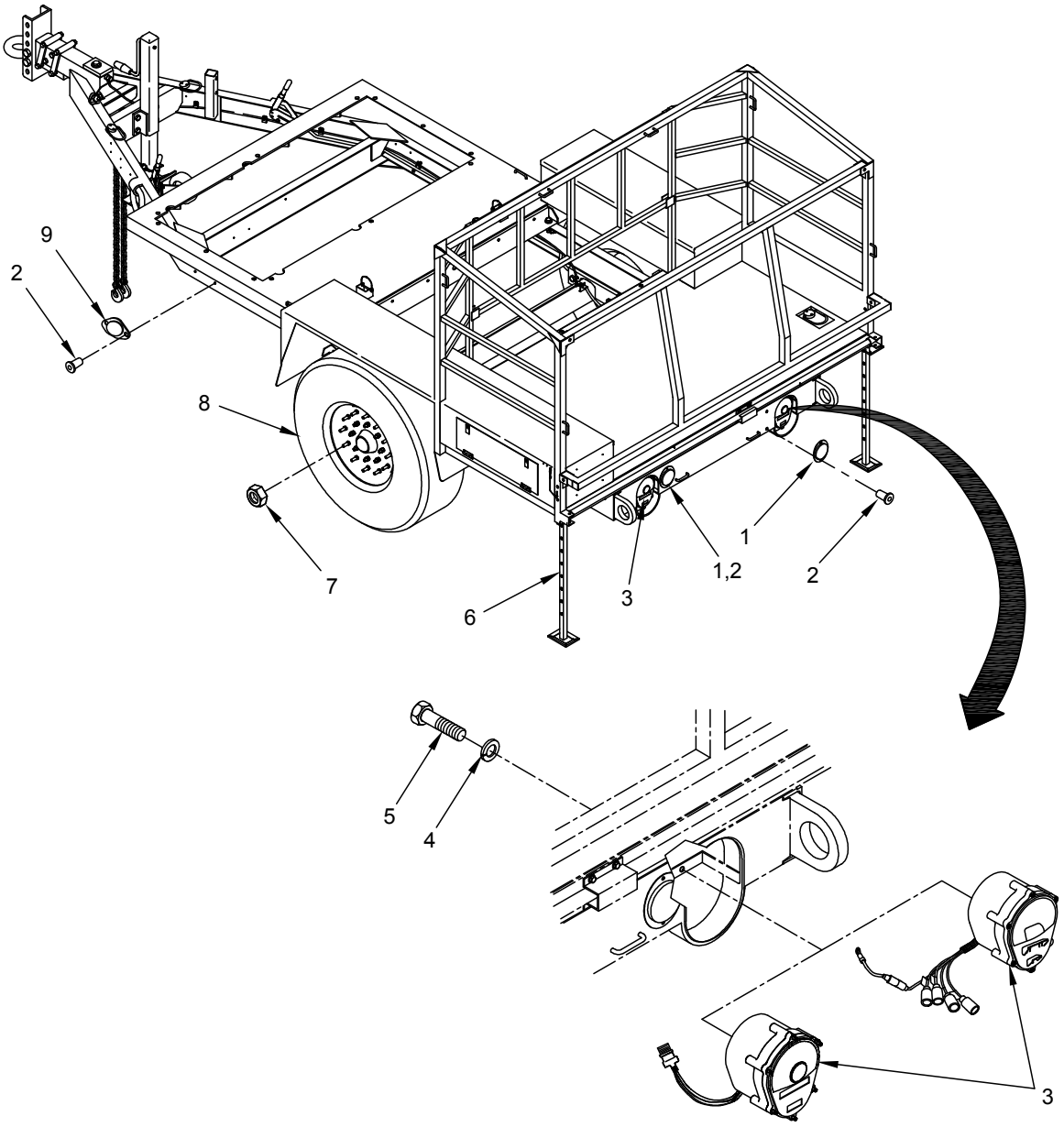


Figure 18. Chassis, Trailer Assembly, T215125G/T215125T (Sheet 1 of 4).

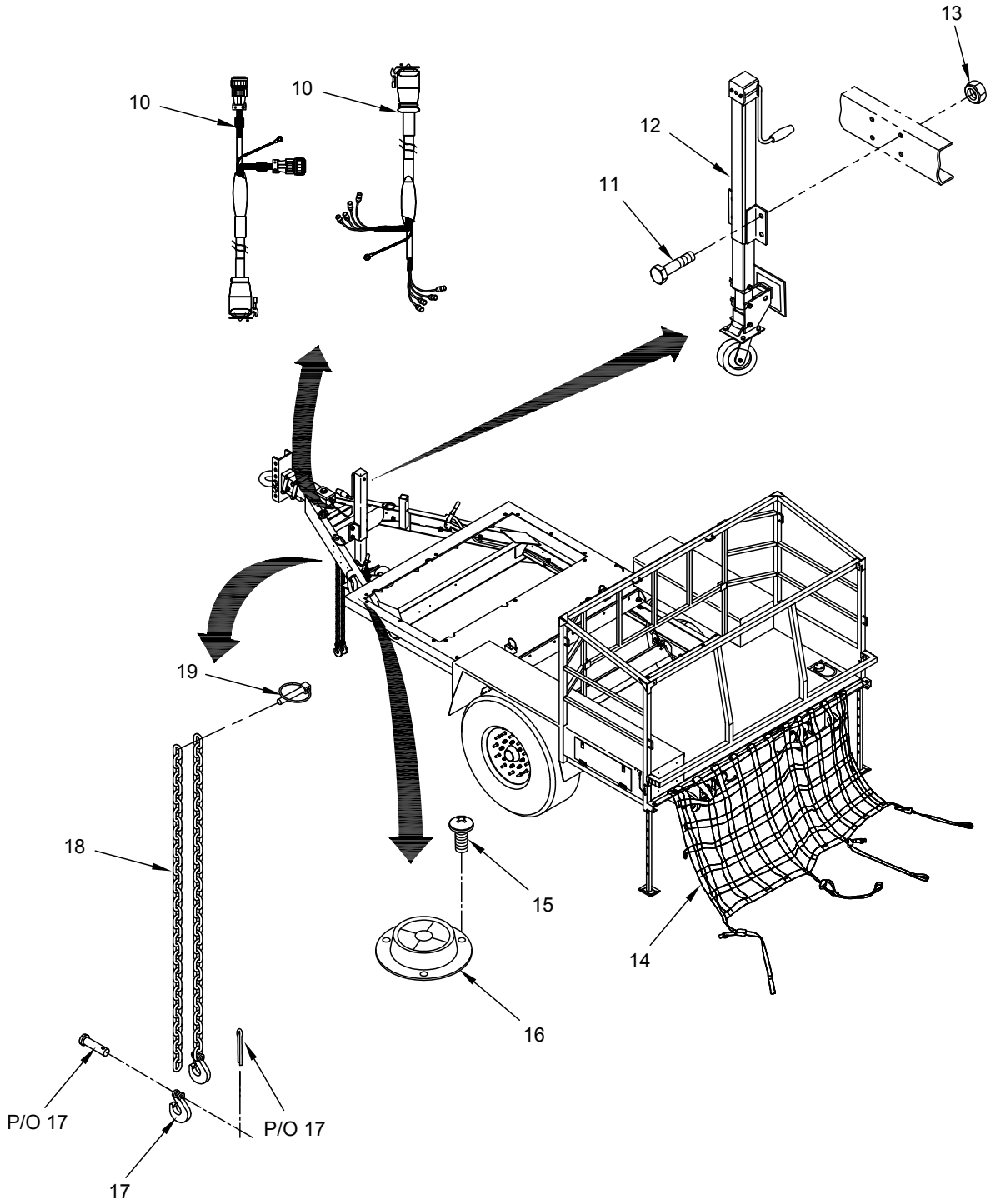


Figure 18. Chassis, Trailer Assembly, T215125G/T215125T (Sheet 2 of 4).

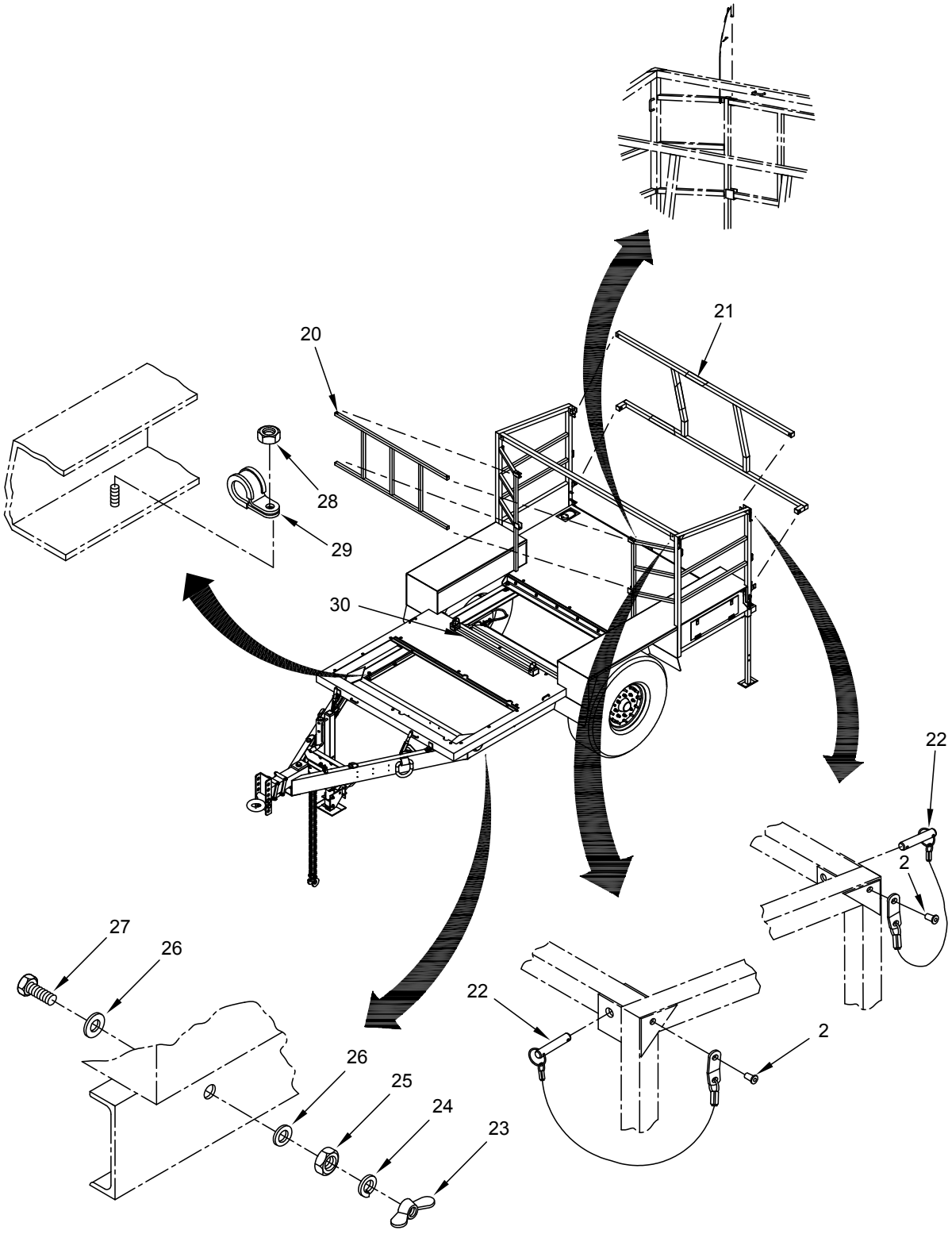


Figure 18. Chassis, Trailer Assembly, T215125G/T215125T (Sheet 3 of 4).

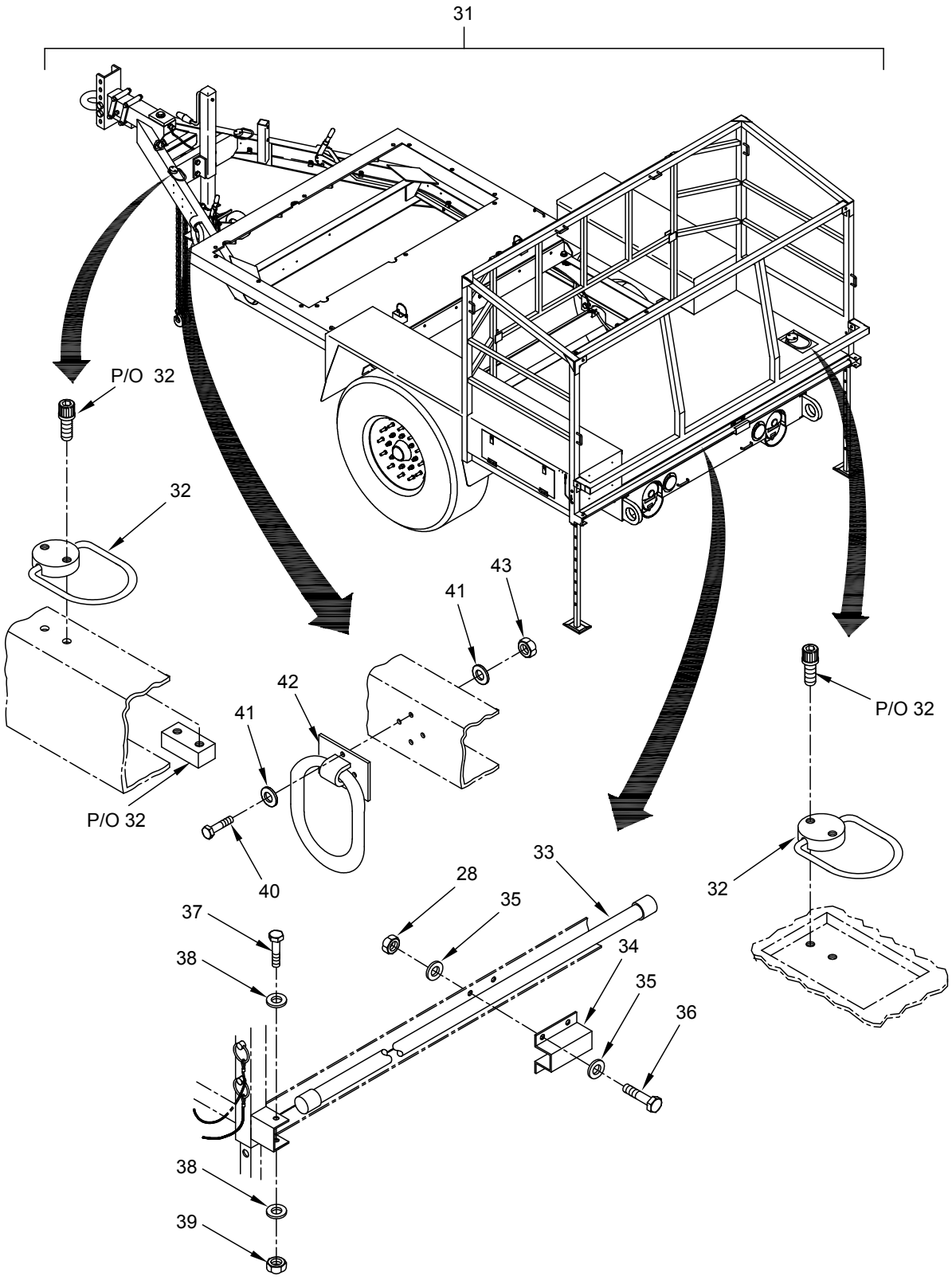


Figure 18. Chassis, Trailer Assembly, T215125G/T215125T (Sheet 4 of 4).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 0103 FIGURE 18 CHASSIS, TRAILER ASSEMBLY, T215125G/T215125T	
1	PAFZZ	6260-01-558-9874	12662	B472R	REFLECTOR, LIGHT	4
2	PAFZZ	5320-01-025-6328	02126	AA-44-D	RIVET, BLIND	20
3	PAFFF	6220-01-552-6229	5A910	12375837-BK-SP	STOP LIGHT,VEHICULAR (SEE FIGURE 19 FOR BREAKDOWN)	2
3	PAFZZ	6210-01-549-6409	13548	07415	LIGHT EMITTING DIODE	2
4	PAFZZ	5310-01-553-0366	1KDE3	100NLIT4	WASHER,LOCK	4
5	PAFZZ	5305-01-552-6254	1KDE3	37C100HCS1	SCREW,CAP,HEXAGON HEAD	4
6	XBFZZ		0WFM3	T211205G	LEG,STABILIZER	2
6	XBFZZ		0WFM3	T211205T	LEG,STABILIZER	2
7	PAFZZ	5310-01-553-8822	62161	T20018C	NUT,PLAIN, CONE SEAT, HEXAGON	16
8	PCFHH	2530-01-493-5859	19207	12460176	WHEEL AND RUNFLAT (REFER TO TM 9-2330-392-14&P FOR MAINTENANCE AND REPAIR PARTS)	2
9	PAFZZ	6260-01-558-9867	12662	B472A	REFLECTOR,LIGHT (AMBER)	2
10	PAFZZ	5995-01-552-6224	5A910	AC-13306	CABLE ASSEMBLY,SPECIAL PURPOSE,ELECTRICAL (CABLE TO BE USED WITH INCANDESCENT TAILLIGHT)	1
10	PAFZZ	5995-01-552-6936	0WFM3	TG903-6752	WIRING HARNESS (HARNESS TO BE USED WITH LED TAILLIGHT)	1
11	PAFZZ	5306-01-554-4332	1KDE3	62C200HCS1	BOLT,MACHINE	4
12	XBFFF		0WFM3	PCHA0175G	TONGUE JACK ASSEMBLY (SEE FIGURE 20 FOR BREAKDOWN) UOC: 89W	1
12	XBFFF		0WFM3	PCHA0175T	TONGUE JACK ASSEMBLY (SEE FIGURE 20 FOR BREAKDOWN) UOC: 89X	1
13	PAFZZ	5310-01-553-0357	74949	NN5811GR8Z	NUT,SELF-LOCKING, HEXAGON	4
14	PAFZZ	2540-01-552-6428	0WFM3	T295153	TAILGATE WEB STRAP	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
15	PAFZZ	5305-01-553-8832	0WFM3	T270034	SCREW,MACHINE	3
16	PAFZZ	5210-01-516-7126	57163	36078	LEVEL,CYLINDRICAL, CIRCULAR VIAL	1
17	PAFZZ	4030-01-553-8070	3TKE1	HKCS312G43EG WL	HOOK,GRAB	2
18	XBFZZ		0WFM3	T210965	CHAIN,SAFETY	2
19	PAFZZ	5315-01-558-6154	0WFM3	PCHA0171	PIN,LOCK	2
20	XBFZZ		0WFM3	TG404-0829G	RESTRAINT,CARGO UOC: 89W	1
20	XBFZZ		0WFM3	TG404-0829T	RESTRAINT,CARGO UOC: 89X	1
21	XBFZZ		0WFM3	TG404-0830G	TAILGATE UOC: 89W	1
21	XBFZZ		0WFM3	TG404-0830T	TAILGATE UOC: 89X	1
22	PAFZZ	4010-01-481-1699	4X630	863-000309	WIRE ROPE ASSEMBLY, SINGLE LEG	12
23	PAFZZ	5310-01-533-2915	3A054	92771A535	NUT,PLAIN,WING	1
24	PAFZZ	5310-01-563-2566	3A054	93496A031	WASHER,LOCK	2
25	PAFZZ	5310-01-485-7896	53711	123-1680562 PC 93	NUT,PLAIN,HEXAGON	1
26	PAFZZ	5310-01-569-5414	39428	92916A405	WASHER,FLAT	2
27	PAFZZ	5305-01-569-5822	39428	92941A626	SCREW,CAP,HEXAGON HEAD	1
28	PAFZZ	5310-01-552-3984	1KDE3	25CNNE1	NUT,SELF-LOCKING, HEXAGON	4
29	PAFZZ	5340-01-476-7532	39428	3225T2	CLAMP,LOOP	5
30	PAFZZ	5975-01-552-6937	0WFM3	T295146	ROD SECTION,GROUND	1
31	XCFFF		0WFM3	TG421-9006G	BRAKE INSTALLATION (SEE FIGURE 21 FOR BREAKDOWN) UOC: 89W	1
31	XCFFF		0WFM3	TG421-9006T	BRAKE INSTALLATION (SEE FIGURE 21 FOR BREAKDOWN) UOC: 89X	1
32	XBFZZ		0WFM3	PCHA0161G	LINK,HOISTING UOC: 89W	4
32	XBFZZ		0WFM3	PCHA0161T	LINK,HOISTING UOC: 89X	4

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
33	XBFZZ		0WFM3	T295154	BAR,CARGO NET	1
34	XBFZZ		0WFM3	T210949	BRACKET,MOUNTING	1
35	PAFZZ	5310-01-552-8314	1KDE3	37NWFL1	WASHER,FLAT	2
36	PAFZZ	5306-01-553-0517	1KDE3	25C300HCS1	BOLT,MACHINE	4
37	PAFZZ	5306-01-553-7509	1KDE3	37C300HCS1	BOLT,MACHINE	2
38	PAFZZ	5310-01-552-2776	1KDE3	25NWFL1	WASHER,FLAT	8
39	PAFZZ	5310-01-479-5890	0Y3H3	70862	NUT,SELF-LOCKING, HEXAGON	2
40	PAFZZ	5306-01-558-7187	1KDE3	50C150HCS1	BOLT,MACHINE	10
41	PAFZZ	5310-01-559-0602	74949	WFSAE127H2	WASHER,FLAT	16
42	XBFZZ		0WFM3	HW903-4024G	PAD EYE UOC: 89W	2
42	XBFZZ		0WFM3	HW903-4024T	PAD EYE UOC: 89X	2
43	PAFZZ	5310-01-559-2446	1KDE3	50CNNE1	NUT,PLAIN,HEXAGON	8
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
STOP LIGHT, VEHICULAR, 12375837-BK-SP

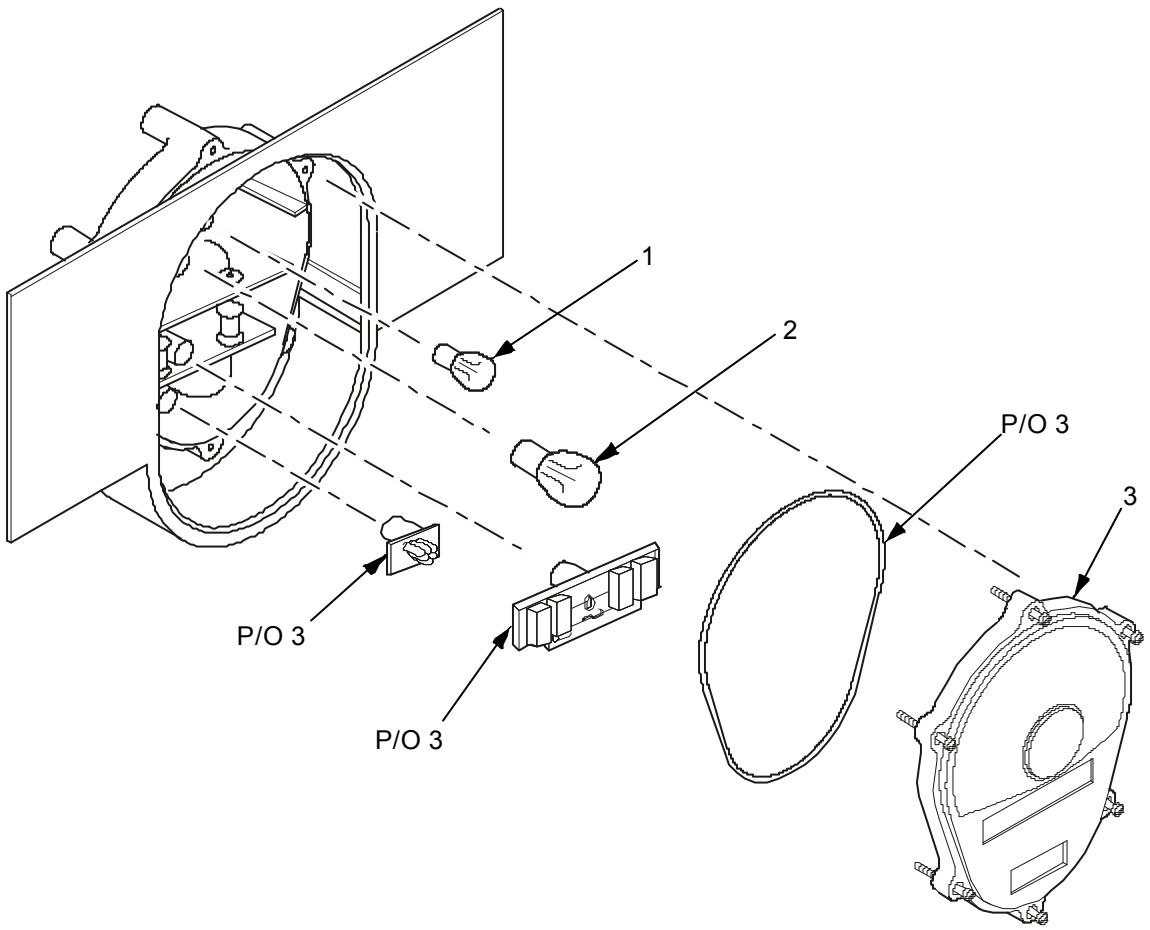


Figure 19. Stop Light, Vehicular, 12375837-BK-SP.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010301	
					FIGURE 19 STOP LIGHT, VEHICULAR 12375837-BK-SP	
1	PAFZZ	6240-00-019-3093	58536	AA52463-A09	LAMP,INCANDESCENT.....	2
2	PAFZZ	6240-00-924-7526	58536	W-L-00111/64	LAMP,INCANDESCENT.....	2
3	PAFZZ	6220-01-359-2870	19207	12375841	LENS,LIGHT.....	2
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
TONGUE JACK ASSEMBLY, PCHA0175G/PCHA0175T

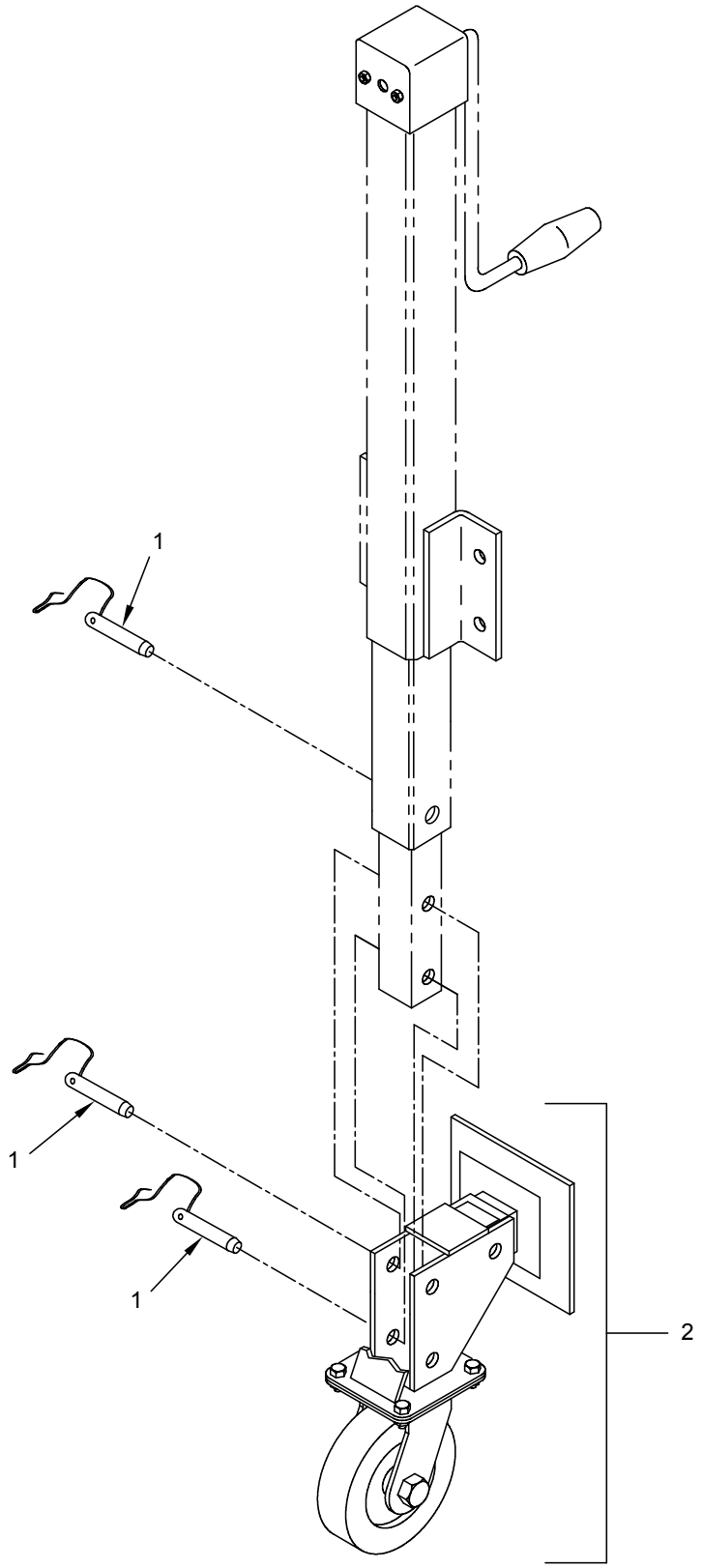


Figure 20. Tongue Jack Assembly, PCHA0175G/PCHA0175T.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010302	
					FIGURE 20 TONGUE JACK ASSEMBLY PCHA0175G/PCHA0175T	
1	PAFZZ		0WFM3	1005514	PIN,RETAINING	3
2	XBFZZ		0WFM3	PCHA0131G	PLATE,SKID/WHEEL UOC: 89W	1
2	XBFZZ		0WFM3	PCHA0131T	PLATE,SKID/WHEEL UOC: 89X	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
BRAKE INSTALLATION, T6421-9006G/T6421-9006T

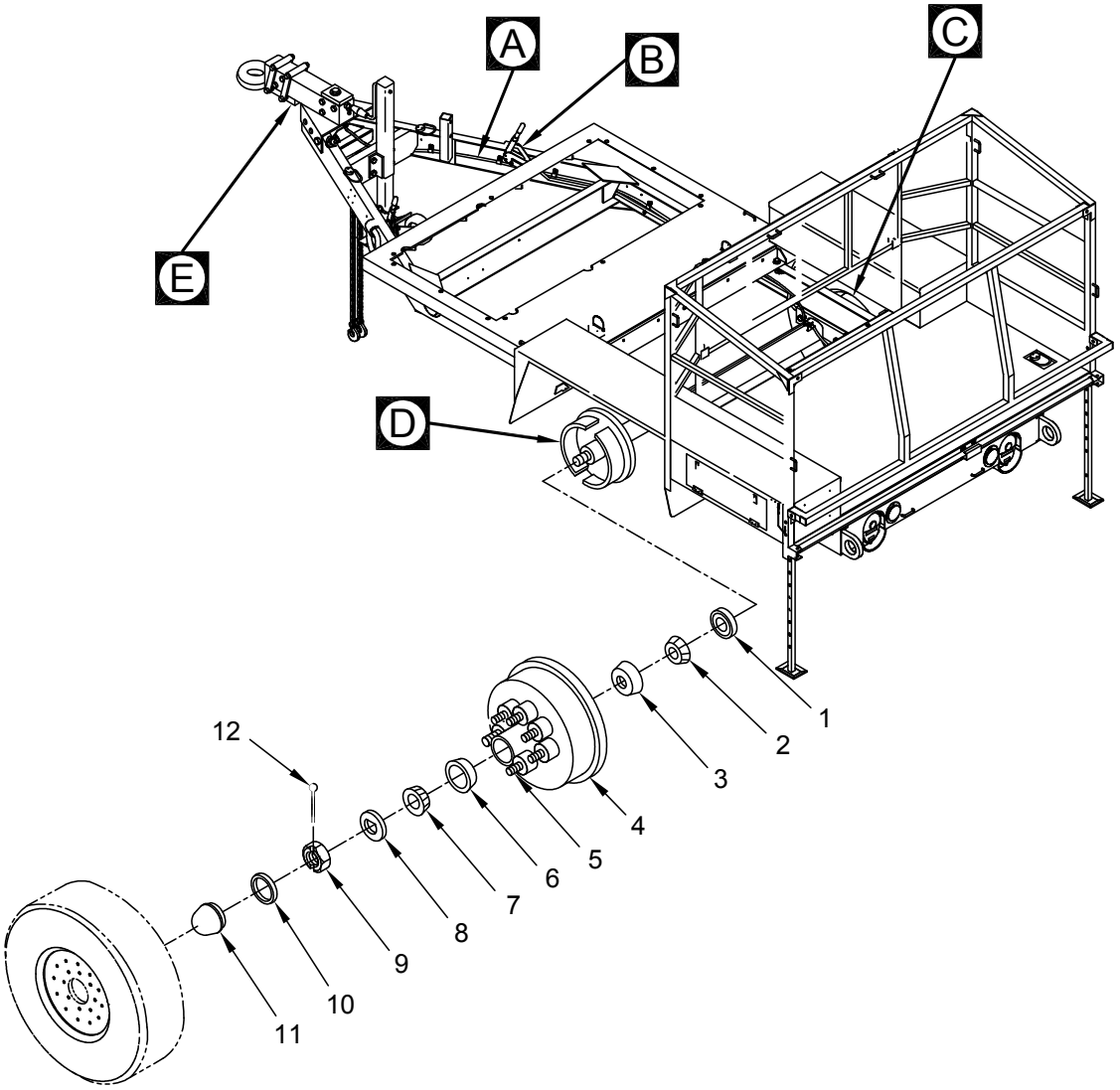


Figure 21. Brake Installation, T6421-9006G/T6421-9006T (Sheet 1 of 5).

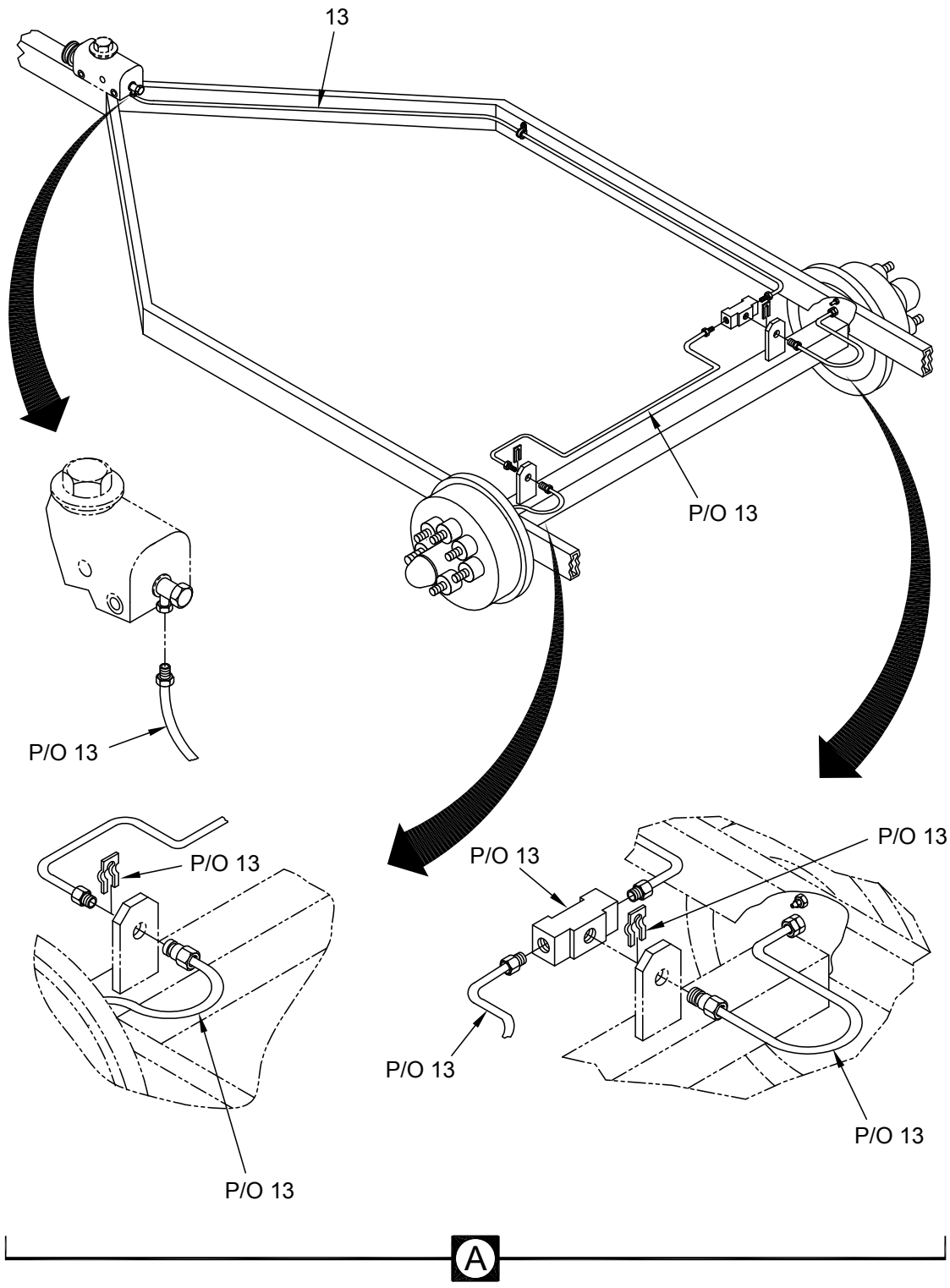


Figure 21. Brake Installation, T6421-9006G/T6421-9006T (Sheet 2 of 5).

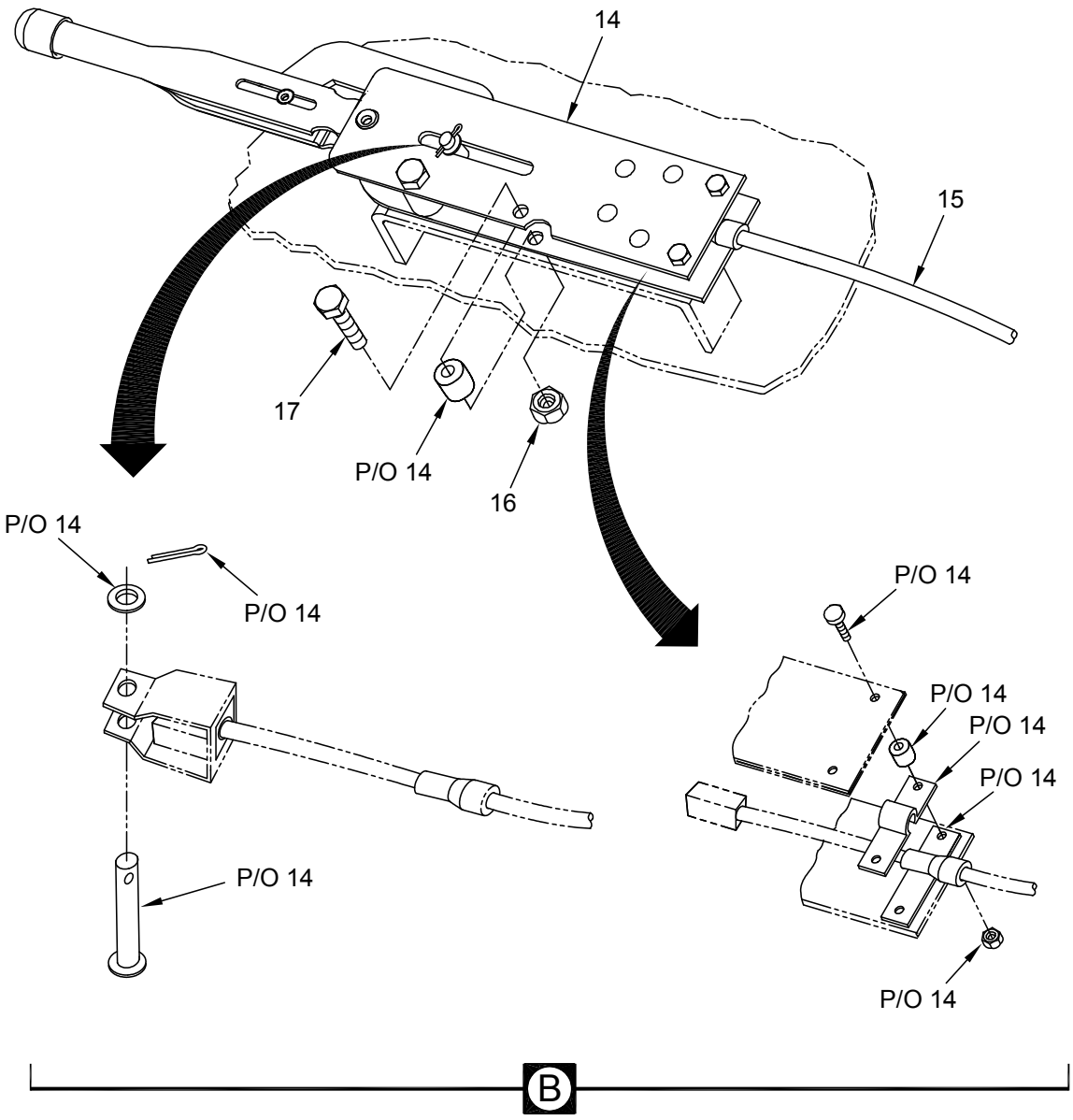


Figure 21. Brake Installation, T6421-9006G/T6421-9006T (Sheet 3 of 5).

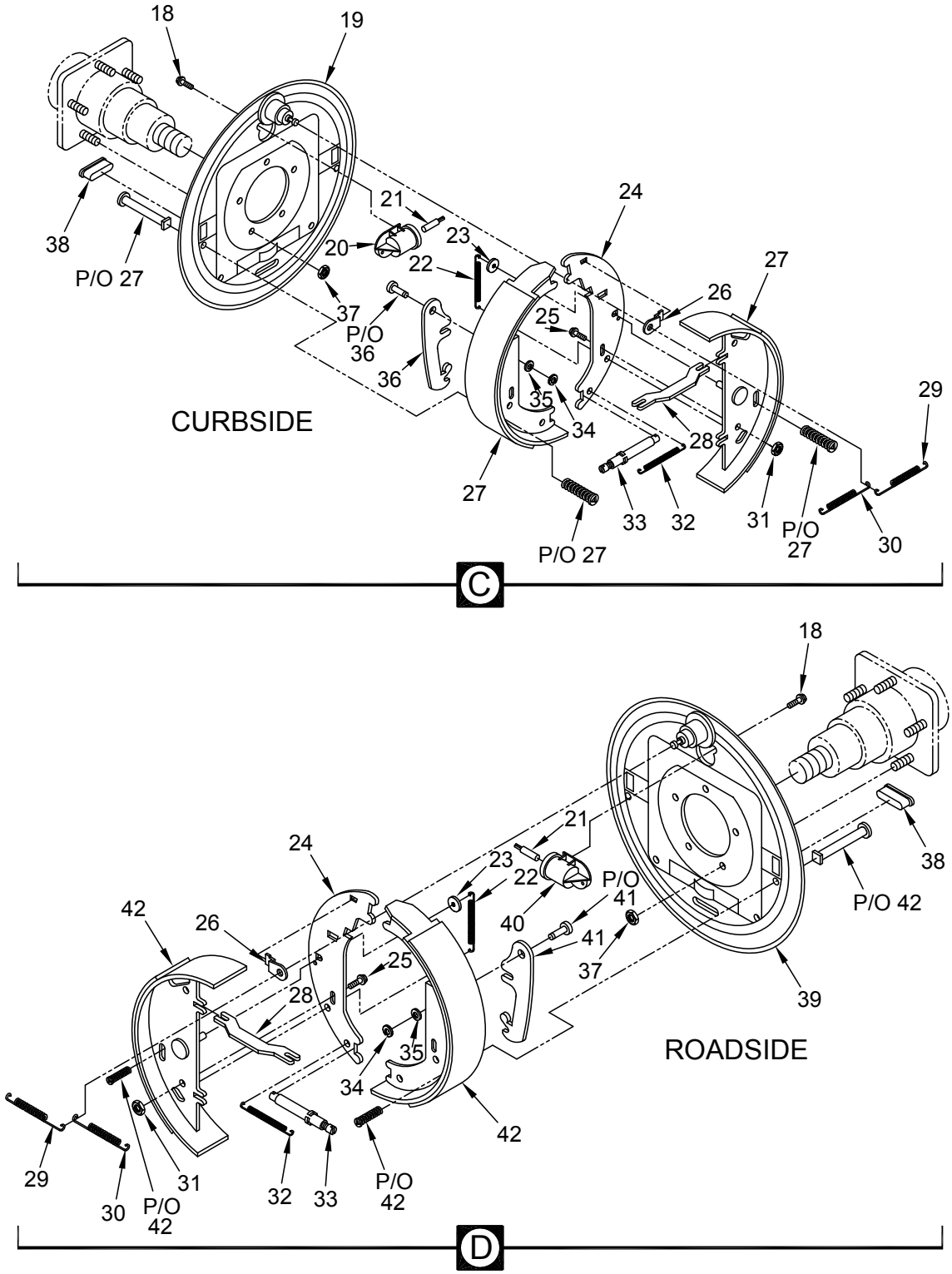


Figure 21. Brake Installation, T6421-9006G/T6421-9006T (Sheet 4 of 5).

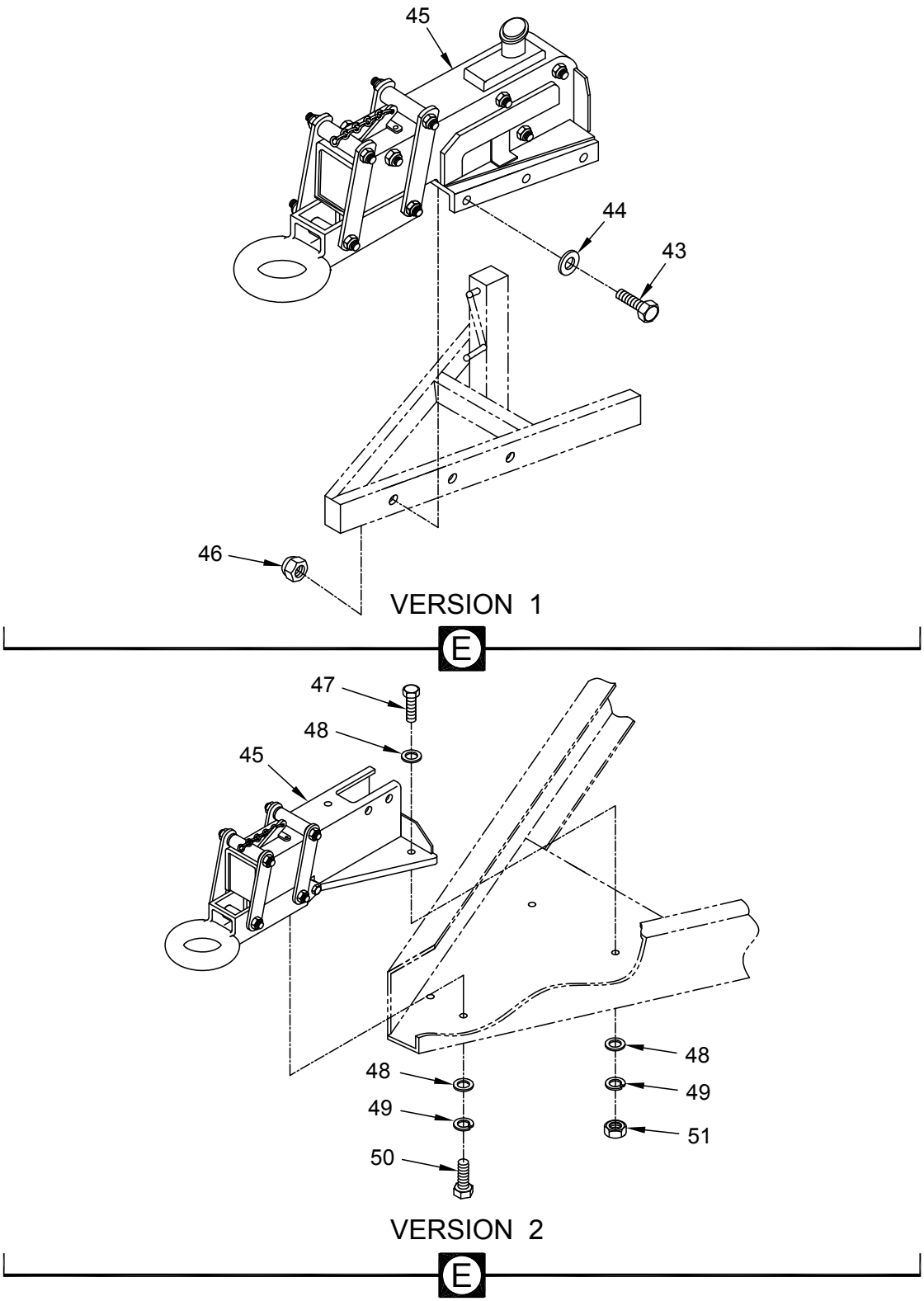


Figure 21. Brake Installation, T6421-9006G/T6421-9006T (Sheet 5 of 5).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010303	
					FIGURE 21 BRAKE INSTALLATION, TG421-9006G/ TG421-9006T	
1	PAFZZ	5330-01-569-5966	15460	010-054-00	SEAL,PLAIN	2
2	PAFZZ	3110-00-100-3541	60038	25580	CONE AND ROLLERS, TAPERED ROLLER BEARING	2
3	PAFZZ	3110-01-524-7337	15460	031-030-01	RING,BEARING,INNER	2
4	PAFZZ	1630-01-570-4484	15460	008-219-13	BRAKE DRUM	2
5	PAFZZ	5307-01-554-0463	15460	007-132-00	STUD,SELF-LOCKING	16
6	PAFZZ	3110-01-568-0751	15460	031-017-01	BEARING, OUTER RACE	2
7	PAFZZ	3110-01-550-0132	07070	031-017-02	CONE,TAPERED ROLLER	2
8	PAFZZ	5310-01-533-1836	15460	005-057-00	WASHER,FLAT	2
9	PAFZZ	5310-01-455-4394	15460	006-176-00	NUT,PLAIN,HEXAGON	2
10	PAFZZ	5331-01-524-8032	15460	010-045-00	O-RING	2
11	PAFZZ	2530-01-192-8464	15460	021-039-00	CAP,GREASE	2
12	PAFZZ	5315-01-519-8470	15460	019-002-00	PIN,COTTER	2
13	PAFZZ		0WFM3	TG903-6704	KIT,TORSION BRAKE LINE	1
14	XBFZZ		01428	165-508-168	LEVER,MANUAL CONTROL	1
15	PAFZZ		0WFM3	TG903-5103	CABLE AND CONDUIT ASSEMBLY,VEHICULAR	1
16	PAFZZ	5310-01-479-5890	0Y3H3	70862	NUT, SELF-LOCKING,HEXAGON	2
17	PAFZZ	5305-01-558-7717	1KDE3	37C200HCS8Y/FT	SCREW,CAP,HEXAGON HEAD	2
18	PAFZZ	5305-01-521-8564	15460	087-001-00	SCREW,CAP,HEXAGON HEAD	4
19	XBFZZ		15460	036-093-26	PLATE,BACK ASSEMBLY	1
20	PAFZZ	2530-01-375-8150	15460	054-065-00	CYLINDER ASSEMBLY, HYDRAULIC BRAKE	1
21	PAFZZ	2530-01-522-0151	15460	054-060-00	PUSH ROD, HYDRAULIC BRAKE MASTER	2
22	PAFZZ	5360-01-568-6048	15460	046-108-01	SPRING	2
23	PAFZZ	5310-01-569-5989	15460	005-064-00	WASHER	2
24	PAFZZ		15460	040-244-01	LEVER,BRAKE SHOE	2
25	PAFZZ	5305-01-569-5976	15460	007-210-00	SCREW	2
26	PAFZZ	2530-01-569-5950	15460	037-069-02	LINK,TRAVEL	2

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
27	PAFZZ	2530-01-552-7040	15460	K71-395-00	BRAKE SHOE	1
28	PAFZZ	2530-01-461-0178	15460	047-119-01	LINK,ANCHOR,BRAKE SHOE	2
29	PAFZZ	5360-01-569-6055	15460	046-107-01	SPRING	2
30	PAFZZ	5360-01-569-6046	15460	046-101-00	SPRING,RETRACTOR	2
31	PAFZZ	5310-01-569-5955	15460	006-011-00	LOCKNUT	2
32	PAFZZ	5360-01-569-6043	15460	046-123-00	SPRING,ADJUSTING SCALE	2
33	PAFZZ	2530-01-456-9099	15460	043-028-00	ADJUSTING SCREW ASSEMBLY	2
34	PAFZZ	5340-01-454-6358	15460	069-055-00	CLIP,SPRING TENSION	2
35	PAFZZ	5310-01-454-2325	15460	005-112-00	WASHER,SPRING TENSION	2
36	PAFZZ	2530-01-456-9107	15460	047-111-01	LEVER AND PIN	1
37	PAFZZ	5310-01-569-5984	15460	006-193-00	NUT,WASHER ASSEMBLY	10
38	PAFZZ	5340-01-535-4672	15460	046-007-00	PLUG,PROTECTIVE,DUST	2
39	XBFZZ		15460	036-093-15	PLATE,BACK ASSEMBLY	1
40	PAFZZ	2530-01-375-8149	15460	054-064-00	CYLINDER ASSEMBLY, HYDRAULIC BRAKE,WHEEL	1
41	PAFZZ	2530-01-457-0173	15460	047-110-01	LEVER AND PIN	1
42	PAFZZ	2530-01-552-7044	15460	K71-394-00	BRAKE SHOE	1
43	PAFZZ	5306-01-558-7187	1KDE3	50C150HCS1	BOLT,MACHINE	6
44	PAFZZ	5310-01-559-0602	74949	WFSAE127H2	WASHER,FLAT	6
45	PAFFF	2530-01-568-0725	0WFM3	TG404-0819G	ACTUATOR ASSEMBLY (SEE FIGURE 22 FOR BREAKDOWN) UOC: 89W	1
45	PAFFF	2530-01-568-0031	0WFM3	TG404-0819T	ACTUATOR ASSEMBLY (SEE FIGURE 22 FOR BREAKDOWN) UOC: 89X	1
45	PAFFF		0WFM3	1002330	ACTUATOR ASSEMBLY (SEE FIGURE 22 FOR BREAKDOWN) UOC: 89W	1
45	PAFFF		0WFM3	1002331	ACTUATOR ASSEMBLY (SEE FIGURE 22 FOR BREAKDOWN) UOC: 89X	1
46	PAFZZ	5310-01-559-2446	1KDE3	50CNNE1	NUT,PLAIN,HEXAGON	6
47	PAFZZ	5306-01-503-8991	1YHH8	8310084	BOLT,1.2-20NF X2.0	2
48	PAFZZ	5310-01-457-8573	0Y3H3	33817	WASHER,FLAT	6
49	PAFZZ	5310-01-598-5134	0Y3H3	33895	WASHER,LOCK	4

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
50	PAFZZ		0Y3H3	18912	BOLT,MACHINE.....	2
51	PAFZZ		0Y3H3	1137084	NUT, SELF-LOCKING,HEXAGON.....	2
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
ACTUATOR ASSEMBLY, TG404-0819G/TG404-0819T OR 1002330/1002331

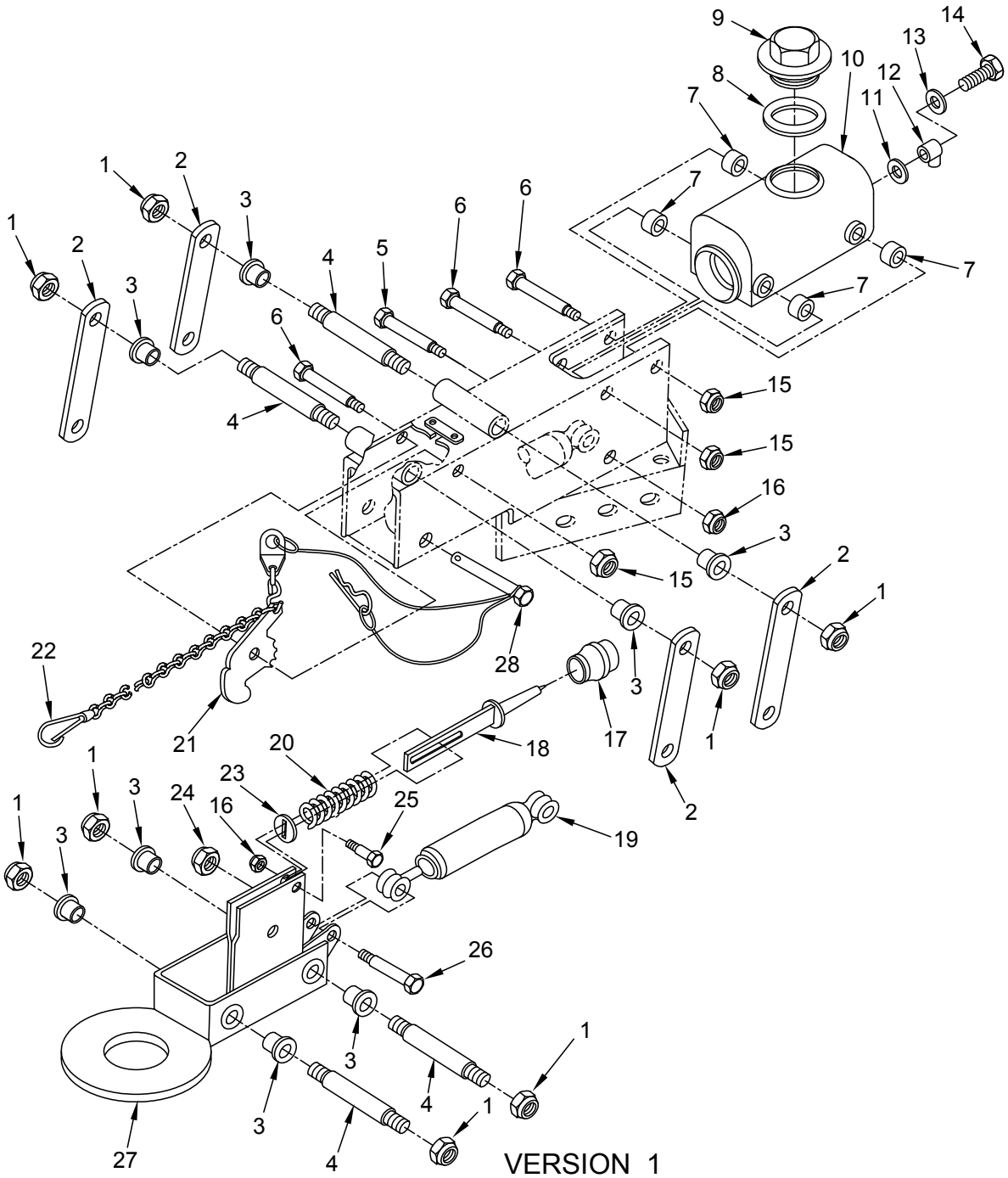


Figure 22. Actuator Assembly, TG404-0819G/TG404-0819T or 1002330/1002331 (Sheet 1 of 2).

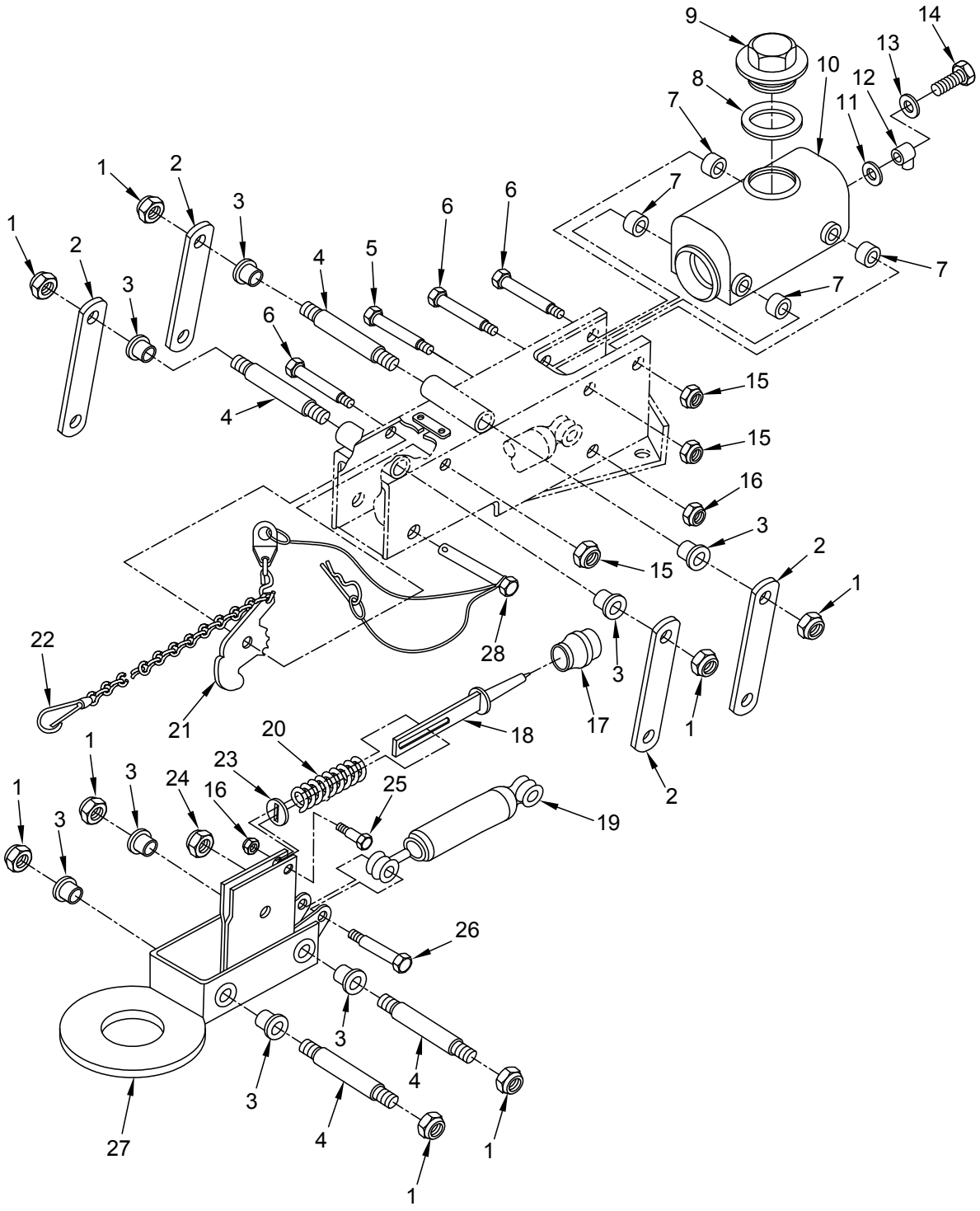


Figure 22. Actuator Assembly, TG404-0819G/TG404-0819T or 1002330/1002331 (Sheet 1 of 2).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 01030301	
					FIGURE 22 ACTUATOR ASSEMBLY, TG404-0819G/ TG404-0819T OR 1002330/1002331	
1	PAFZZ	5310-00-877-5795	80205	MS21044-N8	NUT, SELF-LOCKING, HEXAGON	8
2	PAFZZ		0WFM3	1005629	LINK, CHAIN UOC: 89W	4
2	PAFZZ		0WFM3	1005995	LINK, CHAIN UOC: 89X	4
3	PAFZZ	3120-01-052-1151	33968	35360957	BEARING, SLEEVE	8
4	PAFZZ	2540-01-051-6354	2X264	1829	SHAFT, CHAIN	4
5	PAFZZ	5305-00-710-4205	80205	MS90726-99	SCREW, CAP, HEXAGON HEAD	1
6	PAFZZ	5305-00-709-8423	80204	B1821BH044F350N	SCREW, CAP, HEXAGON HEAD	3
7	PAFZZ	5365-01-053-6898	19207	12356021	SPACER, SLEEVE	4
8	PAFZZ	5330-00-291-6658	11083	9B1545	GASKET	1
9	PAFZZ		0WFM3	1009832	CAP, FILLER OPENING UOC: 89W	1
9	PAFZZ		0WFM3	1009833	CAP, FILLER OPENING UOC: 89X	1
10	PAFZZ	2530-01-050-8929	55683	1441-10614	CYLINDER ASSEMBLY, HYDRAULIC BRAKE	1
11	PAFZZ	5310-00-275-6635	94988	FC602	WASHER, FLAT	1
12	PAFZZ	5340-01-570-9063	19207	12362746	CONNECTOR	1
13	PAFZZ	5310-00-209-1761	19207	10896710	WASHER, FLAT	1
14	PAFZZ	4730-01-053-8468	19207	8762000	BOLT, FLUID PASSAGE	1
15	PAFZZ	5310-00-959-1488	81349	M45913/2-6FG5C	NUT, SELF-LOCKING, HEXAGON	3
16	PAFZZ	5310-00-057-7080	81349	M45913/1-7FG5C	NUT, SELF-LOCKING, HEXAGON	2
17	PAFZZ	5340-01-456-6458	19207	12356020	BOOT, DUST AND MOISTURE SEAL	1
18	PAFZZ	2530-01-167-1999	19207	12356014	PUSH ROD, HYDRAULIC BRAKE MASTER	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
19	PAFZZ	2510-00-050-7136	1JZ80	1844-2	SHOCK ABSORBER, DIRECT ACTION	1
20	PAFZZ	5360-01-054-2281	19207	12356018	SPRING	1
21	PAFZZ	2530-01-050-7698	1JZ80	1804	LEVER BREAKAWAY	1
22	PAFZZ	5340-01-385-9852	96508	760-4131#1408	SNAP, HOOK	1
23	PAFZZ	5310-01-050-8832	19207	12356017	WASHER, PUSH ROD	1
24	PAFZZ	5310-00-074-2328	80205	MS21083C7	NUT, SELF-LOCKING, HEXAGON	1
25	PAFZZ	5305-00-949-6184	80205	MS51975-2	SCREW, SHOULDER	1
26	PAFZZ	5305-00-709-8542	80204	B1821BH044F200N	SCREW, CAP, HEXAGON HEAD	1
27	PAFZZ		0WFM3	1009945	COUPLER,DRAWBAR RING UOC: 89W	1
27	PAFZZ		0WFM3	1009946	COUPLER,DRAWBAR RING UOC: 89X	1
28	PAFZZ	5315-01-569-5347	0WFM3	1001136	PIN, LOCKING	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
TENT, MXA2000G/MXA2000T

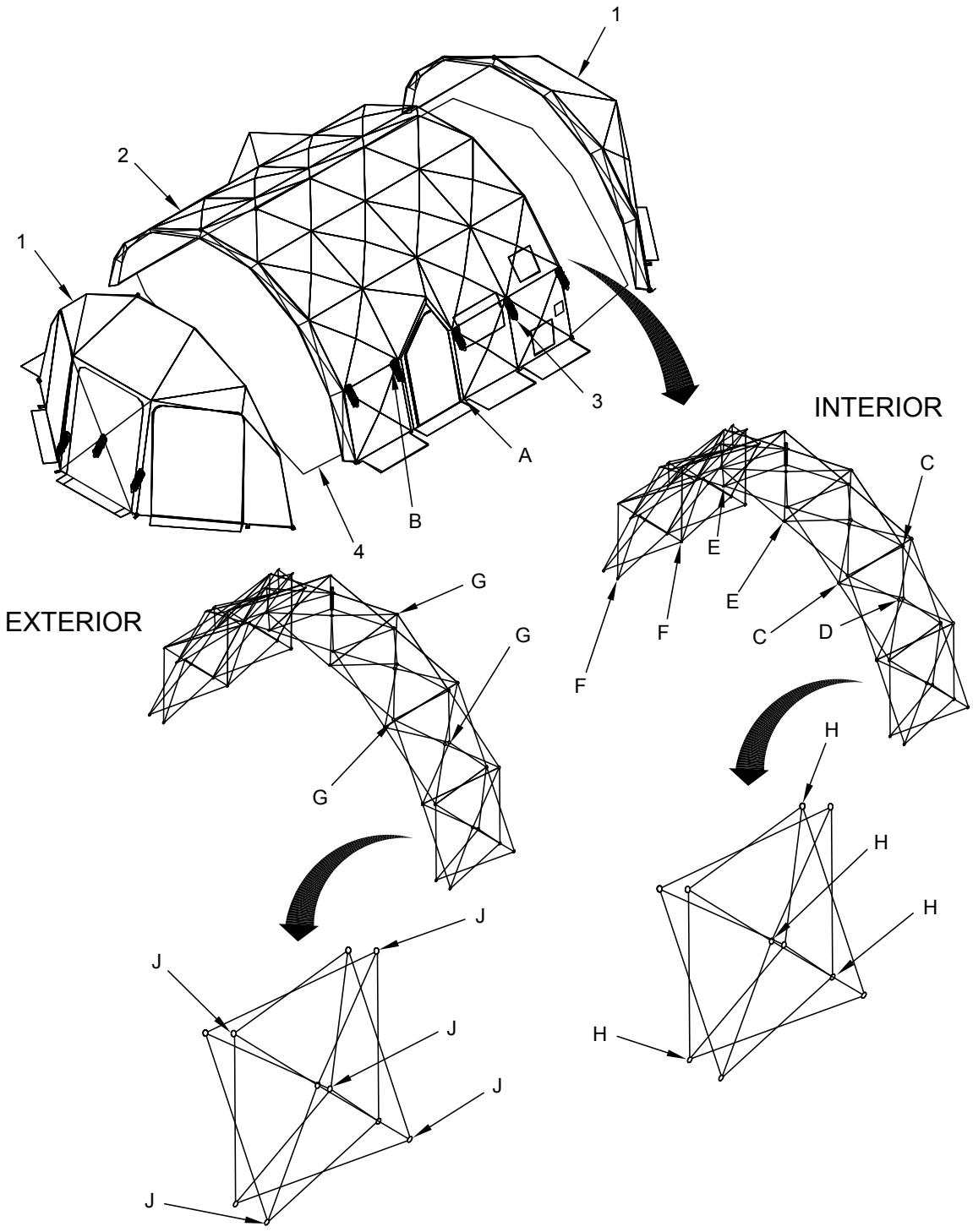


Figure 23. Tent, MXA2000G/MXA2000T (Sheet 1 of 3).

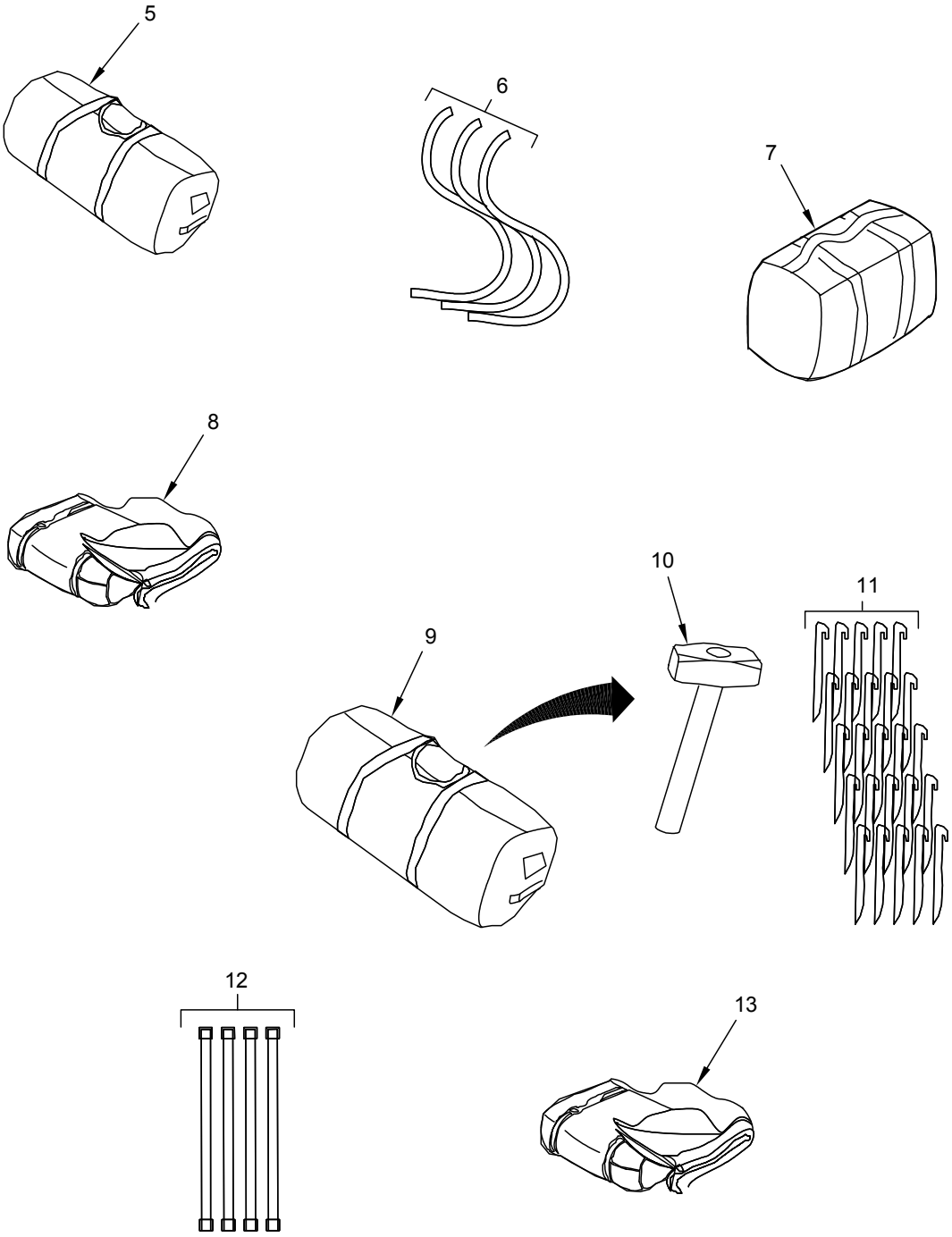


Figure 23. Tent, MXA2000G/MXA2000T (Sheet 2 of 3).

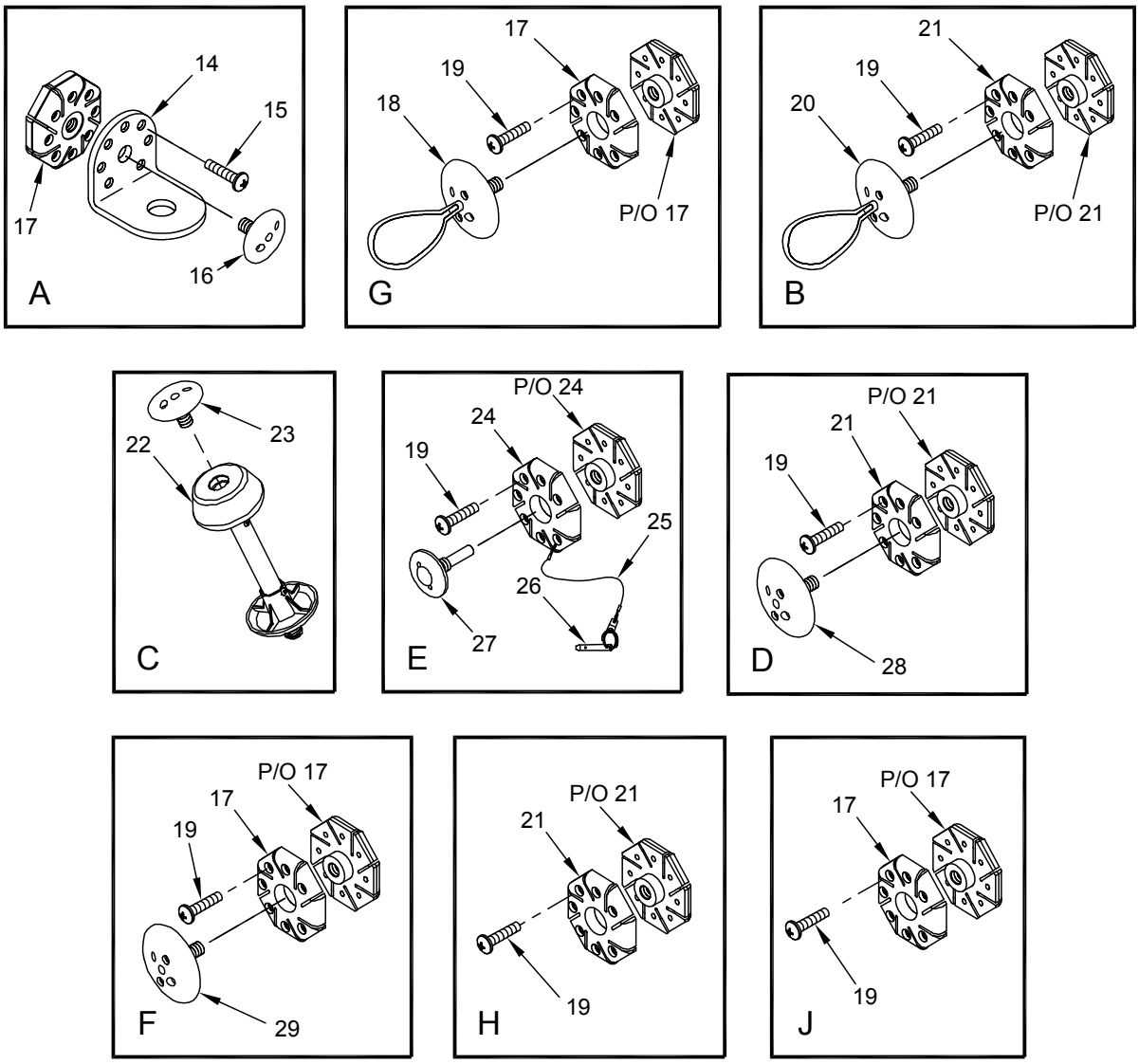


Figure 23. Tent, MXA2000G/MXA2000T (Sheet 3 of 3).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 0104	
					FIGURE 23 TENT MXA2000G/MXA2000T	
1	XBCFF	8340-01-589-9512	0WFM3	MXA2020G	BAG.TENT FRAME PARTS (SEE FIGURE 24 FOR BREAKDOWN) ...	2
					UOC: 89W	
1	XBCFF	8340-01-589-9518	0WFM3	MXA2020T	BAG.TENT FRAME PARTS(SEE FIGURE 24 FOR BREAKDOWN) ...	2
					UOC: 89X	
2	XBCFF		0WFM3	MXA2035G	TENT,ROOF AND SIDES (SEE FIGURE 25 FOR BREAKDOWN) ...	1
					UOC: 89W	
2	XBCFF		0WFM3	MXA2035T	TENT,ROOF AND SIDES (SEE FIGURE 25 FOR BREAKDOWN) ...	1
					UOC: 89X	
3	PACZZ	4020-01-570-4924	0WFM3	A602050	ROPE,FIBROUS	16
4	PACZZ	8340-01-571-6948	0WFM3	MXA2025F	TENT FLOOR.....	1
5	PACZZ	8340-01-556-7416	0WFM3	MA100735	REPAIR KIT,COVERS (SEE EXPENDABLE ITEMS LIST FOR CONTENTS).....	1
					UOC: 89W	
5	PACZZ	5410-01-570-4998	0WFM3	MA100740	REPAIR KIT,COVERS (SEE EXPENDABLE ITEMS LIST FOR CONTENTS).....	1
					UOC: 89X	
6	PACZZ	5340-01-558-9644	0WFM3	A600250	ADAPTER,TIE DOWN	3
7	PACZZ	8340-01-553-0054	0WFM3	MXA2040B	CASE,TENT	1
8	PACZZ	8340-01-540-7600	0WFM3	MXA1054G	CONNECTOR,TENT GUSSET.....	4
					UOC: 89W	
8	PACZZ	8340-01-540-7608	0WFM3	MXA1054T	CONNECTOR,TENT GUSSET.....	4
					UOC: 89X	
9	PACZZ		0WFM3	MA100165	TENT STAKE BAG	1
10	PACZZ	5120-01-399-9252	1CV05	1434G	HAMMER,HAND	1
11	PACZZ	8340-01-571-6274	0WFM3	A601250	STAKE PIN,STEEL	25
12	PACZZ	5340-01-558-7299	0WFM3	A602650	POLE,PUSH.....	4
13	PACZZ	8340-01-540-7490	0WFM3	MXA1055G	PASSAGEWAY,TENT	1
					UOC: 89W	
13	PACZZ	8340-01-540-7495	0WFM3	MXA1055T	PASSAGEWAY,TENT	1
					UOC: 89X	

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
14	PACZZ	5340-01-553-1413	0WFM3	MA100720	BRACKET,MOUNTING	10
15	PACZZ	5305-01-553-0673	1KDE3	25K100MX81	SCREW,MACHINE	70
16	PACZZ	5340-01-558-8890	0WFM3	A601651	KEEPER,BELT-STRAP UOC: 89W	10
16	PACZZ	5365-01-558-6149	0WFM3	A601661	PLUG,MACHINE THREAD UOC: 89X	10
17	PACZZ	5340-01-558-8820	0WFM3	SH410-0201G	CONNECTOR,ROD END UOC: 89W	70
17	PACZZ	3010-01-558-7646	0WFM3	SH410-0201T	HUB,COUPLING,FLEXIBLE UOC: 89X	70
18	PACZZ	5340-01-558-9652	0WFM3	JA201005	KEEPER,BELT-STRAP UOC: 89W	10
18	PACZZ	5340-01-558-9289	0WFM3	JA201000	KEEPER,BELT-STRAP UOC: 89X	10
19	PACZZ	5305-01-553-7511	IKDE3	25K75MX71	SCREW,MACHINE	1,104
20	PACZZ	5340-01-558-7324	0WFM3	JA200980	KEEPER,LOOPED	26
21	PACZZ	5340-01-558-9807	0WFM3	SH410-0201W	CONNECTOR,ROD END	64
22	PACZZ	5340-01-558-8848	0WFM3	F329905	CONNECTOR,ROD END	24
23	PACZZ	5340-01-558-7292	0WFM3	A601681	KEEPER,PLAIN	24
24	PACZZ	5430-01-570-4415	0WFM3	SH410-0202	HUB,MAIN W/PIN,WHITE	4
25	PACZZ	4020-01-553-0415	0WFM3	T270923	CORD ASSEMBLY,FIBROUS	4
26	PACZZ	5315-01-552-8301	0WFM3	A600115	PIN,QUICK RELEASE	4
27	PACZZ	5340-01-559-0471	0WFM3	A600116	CONNECTOR,ROD END	4
28	PACZZ	5340-01-558-7288	0WFM3	JA200921	KEEPER,PLAIN	10
29	PACZZ	5340-01-558-9804	0WFM3	JA200881	KEEPER,BELT-STRAP UOC: 89W	46
29	PACZZ	5340-01-558-8533	0WFM3	JA200901	KEEPER,BELT-STRAP UOC: 89X	46
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
TENT, END CAP, MXA2020G/MXA2020T

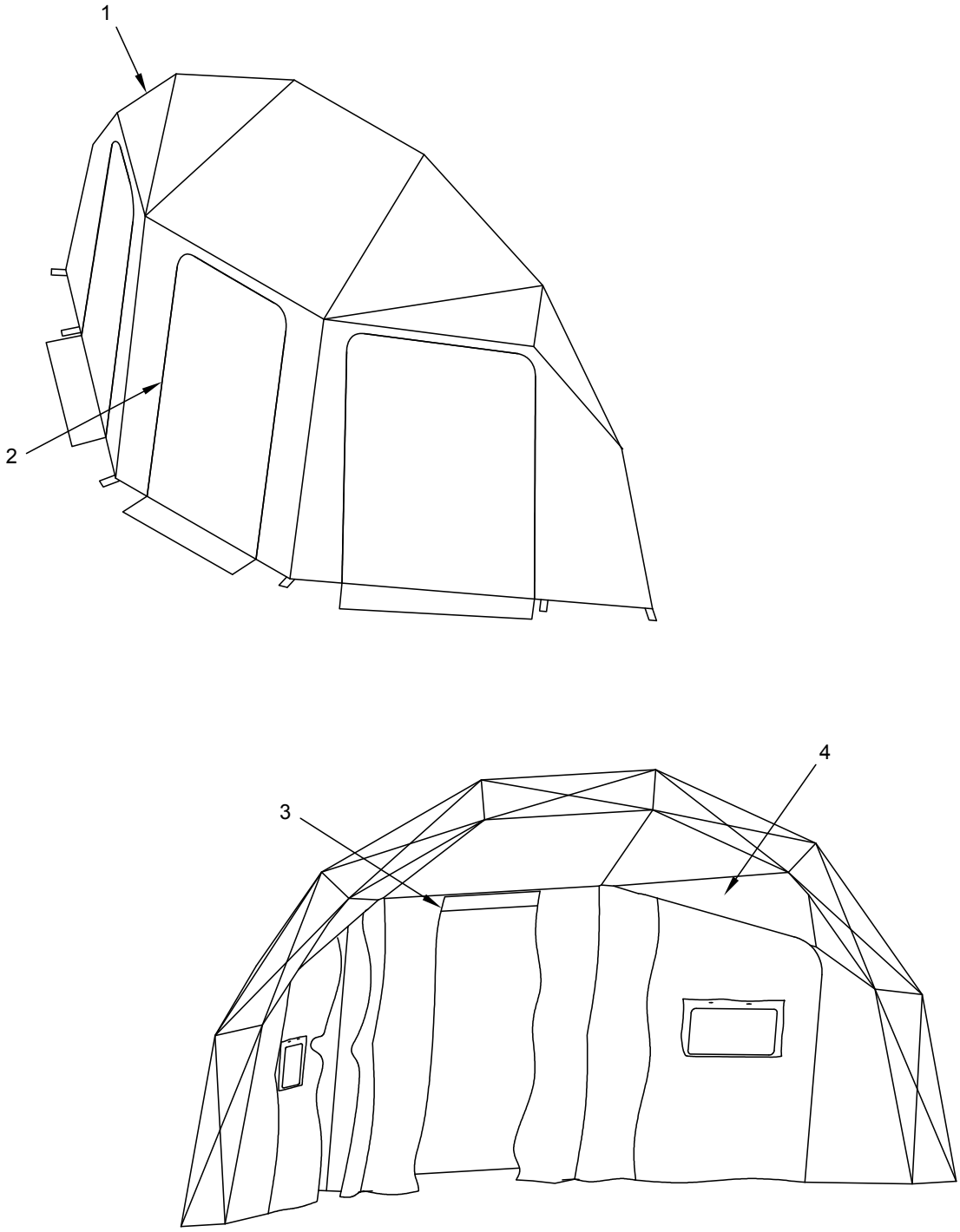


Figure 24. Tent, End Cap, MXA2020G/MXA2020T (Sheet 1 of 3).

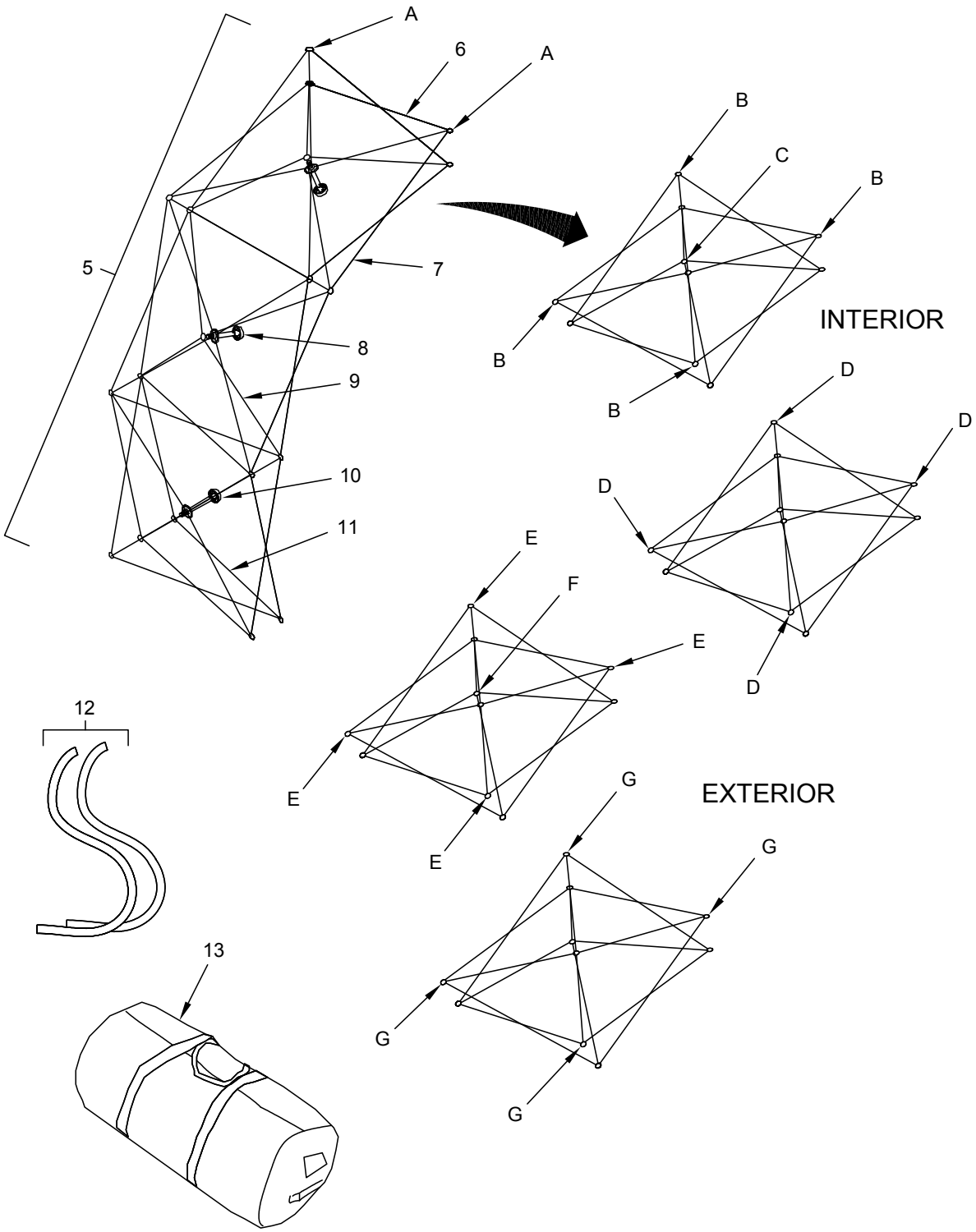


Figure 24. Tent, End Cap, MXA2020G/MXA2020T (Sheet 2 of 3).

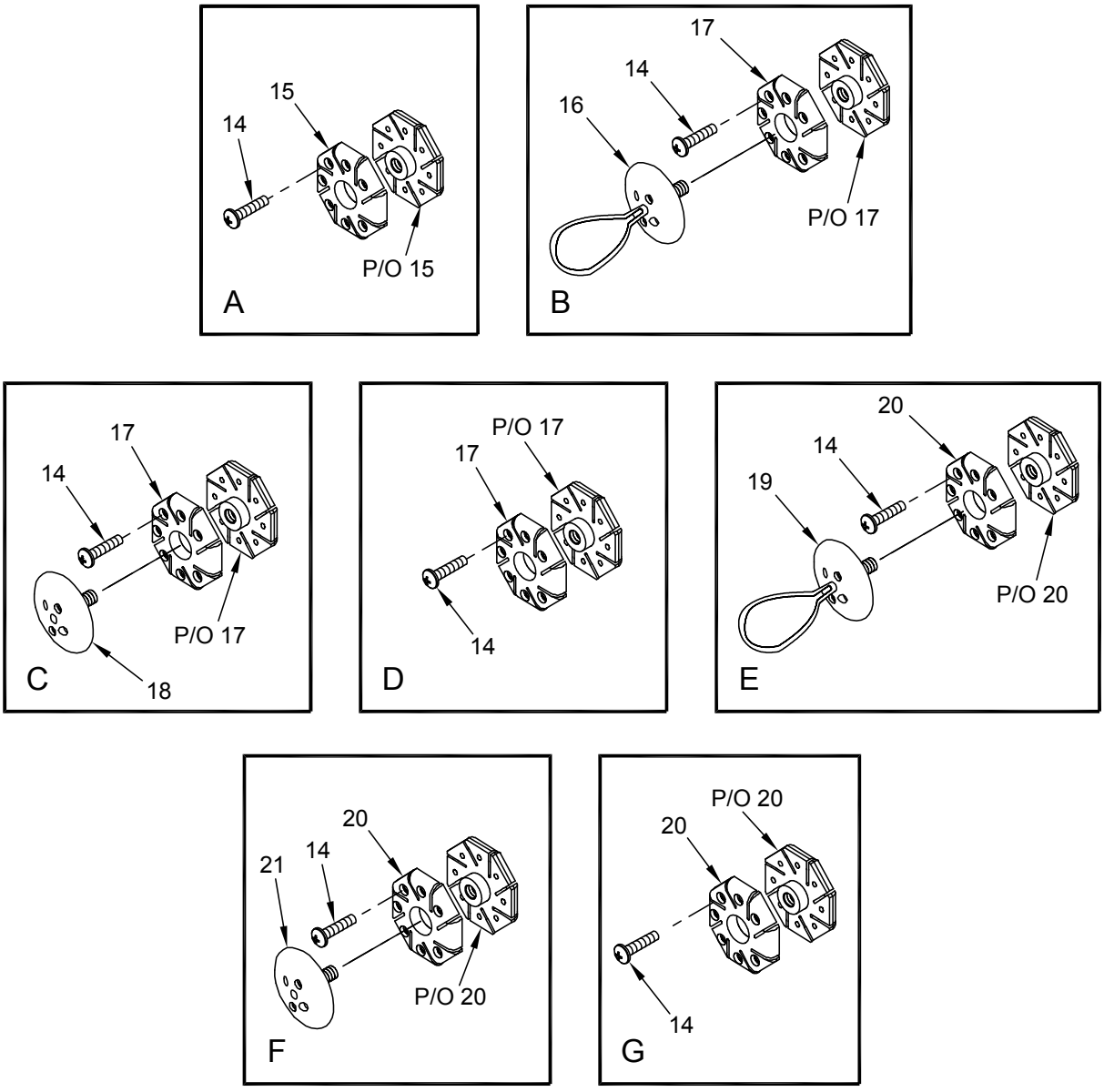


Figure 24. Tent, End Cap, MXA2020G/MXA2020T (Sheet 3 of 3).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010401	
					FIGURE 24 TENT, END CAP MXA2020G/MXA2020T	
1	PACZZ	8340-01-572-0658	0WFM3	MXS1015G	COVER,EXTERIOR,END CAP, GREEN	1
					UOC: 89W	
1	PACZZ	8340-01-571-8798	0WFM3	MXS1015T	COVER,EXTERIOR,END CAP, TAN	1
					UOC: 89X	
2	PACZZ	8340-01-572-0505	0WFM3	MXS1020G	DOOR,EXTERIOR,END CAP	2
					UOC: 89W	
2	PACZZ	8340-01-571-6458	0WFM3	MXS1020T	DOOR,EXTERIOR,END CAP	2
					UOC: 89X	
3	PACZZ	8340-01-571-9776	0WFM3	MXS1020W	DOOR,INTERIOR END CAP	2
4	PACZZ	8340-01-571-6878	0WMF3	MXS1015W	COVER,INTERIOR, END CAP	1
5	XBCFF		0WMF3	MXA2016G	TENT FRAME,END CAP	2
					UOC: 89W	
5	XBCFF		0WMF3	MXA2016T	TENT FRAME,END CAP	2
					UOC: 89X	
6	PACZZ	8340-01-571-9871	0WFM3	F329601	STRUT,A-SIDE BLUE	5
7	PACZZ	8340-01-571-9552	0WFM3	F329631	STRUT,B-SIDE RED	4
8	PACZZ	5340-01-558-8848	0WFM3	F329905	CONNECTOR,ROD END	2
9	PACZZ	8340-01-571-6590	0WFM3	F329781	STRUT,B-SIDE YELLOW	8
10	PACZZ	5340-01-558-8873	0WFM3	F329908	CONNECTOR,ROD END	1
11	PACZZ	8340-01-571-9857	0WFM3	F329751	STRUT,A-SIDE GREEN	4
12	PACZZ	5340-01-558-9644	0WFM3	A600250	ADAPTER,TIE DOWN	2
13	PACZZ	8340-01-589-9473	0WFM3	MXA2045B	TRANSPORT BAG,END CAP	1
14	PACZZ	5305-01-552-8305	1KDE3	8D50TXP1	SCREW,MACHINE	192
15	PACZZ	5340-01-558-9666	0WFM3	SH410-0401R	CONNECTOR,ROD END	2
16	PACZZ	5340-01-558-7313	0WFM3	A601680	KEEPER,LOOPED	6
17	PACZZ	5340-01-558-8758	0WFM3	SH410-0001W	CONNECTOR,ROD END	9
18	PACZZ	5340-01-558-7292	0WFM3	A601681	KEEPER,PLAIN	3
19	PACZZ	5340-01-558-9677	0WFM3	A601650	KEEPER,BELT-STRAP	7
					UOC: 89W	
19	PACZZ	5340-01-558-9133	0WFM3	A601660	KEEPER,BELT-STRAP	7
					UOC: 89X	

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
20	PACZZ	5340-01-558-8752	0WFM3	SH410-0001G	CONNECTOR,ROD END ..... UOC: 89W	11
20	PACZZ	5340-01-558-8512	0WFM3	SH410-0001T	CONNECTOR,ROD END ..... UOC: 89X	11
21	PACZZ	5340-01-558-8890	0WFM3	A601651	KEEPER,BELT-STRAP ..... UOC: 89W	2
21	PACZZ	5365-01-558-6149	0WFM3	A601661	PLUG,MACHINE THREAD ..... UOC: 89X	2
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
TENT, ROOF AND SIDES, MXA2035G/MXA2035T

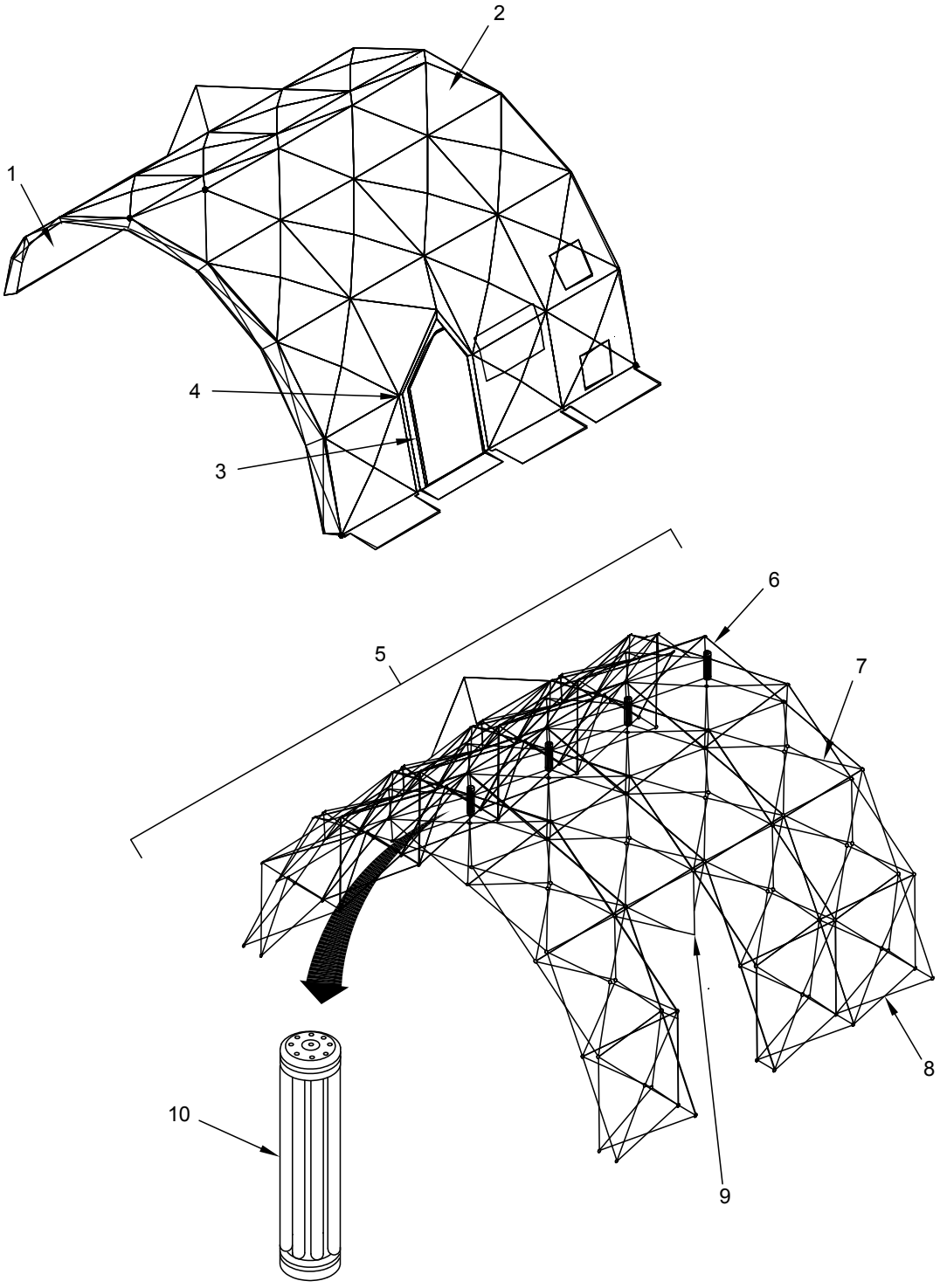


Figure 25. Tent, Roof and Sides, MXA2035G/MXA2035T.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010402	
					FIGURE 25 TENT, ROOF AND SIDES MXA2035G/MXA2035T	
1	XBCZZ		0WFM3	MXA2010W	COVER,INTERIOR	1
2	XBCZZ		0WFM3	MXA2005G	COVER,EXTERIOR,GREEN UOC: 89W	1
2	XBCZZ		0WFM3	MXA2005T	COVER,EXTERIOR,TAN UOC: 89X	1
3	PACZZ	8340-01-572-0624	0WFM3	MA100130	SIDE DOOR,EXTERIOR, GREEN UOC: 89W	2
3	PACZZ	8340-01-571-6456	0WFM3	MA100530	SIDE DOOR,EXTERIOR,TAN UOC: 89X	2
4	PACZZ	8340-01-571-9444	0WFM3	MA100310	SIDE DOOR,INTERIOR,WHITE	2
5	XBCZZ		0WMF3	MXA2015G	TENT FRAME,MAIN UOC: 89W	1
5	XBCZZ		0WMF3	MXA2015T	TENT FRAME,MAIN UOC: 89X	1
6	PACZZ	8340-01-572-0722	0WFM3	MF300140	STRUT,B-SIDE,RED	37
7	PACZZ	8340-01-572-7030	0WFM3	MF300150	STRUT,B-SIDE,YELLOW	96
8	PACZZ	8340-01-571-6673	0WFM3	MF300130	STRUT,A-SIDE,BLUE	28
9	PACZZ	8340-01-571-9659	0WFM3	MF300200	STRUT,CANOPY	4
10	PACZZ	8340-01-572-0876	0WFM3	MF300160	STRUT,RISER	16
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
LIGHT SET, TENT, H300070

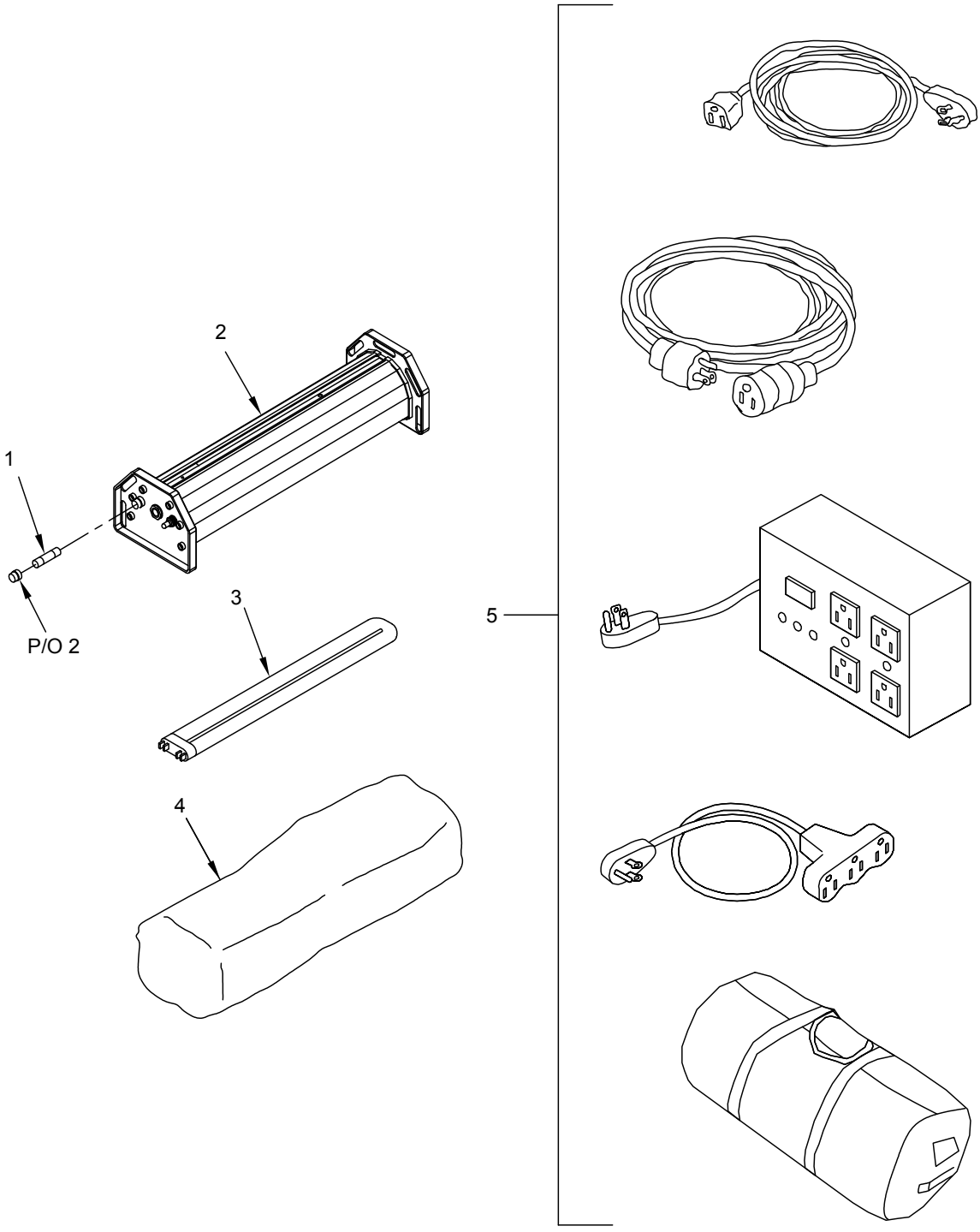


Figure 26. Light Set, Tent, H300070.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 0106	
					FIGURE 26 LIGHT SET, TENT H300070	
1	PAFZZ	5920-00-010-6652	81349	F02A250V3A	FUSE,CARTRIDGE	4
2	PAFZZ	6210-01-552-7806	0WFM3	H300000	FIXTURE,LIGHTING	4
3	PAFZZ	6240-01-552-6217	1FHF4	FT55DL841	LAMP,FLUORESCENT	4
4	PAFZZ		0WFM3	MA100170	BAG,LIGHT SET	2
5	XCFFF		0WFM3	T2-95205	WIRING KIT,ELECTRICAL (SEE FIGURE 27 FOR BREAKDOWN)	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
REPAIR PARTS LIST
WIRING KIT, ELECTRICAL, T2-95205

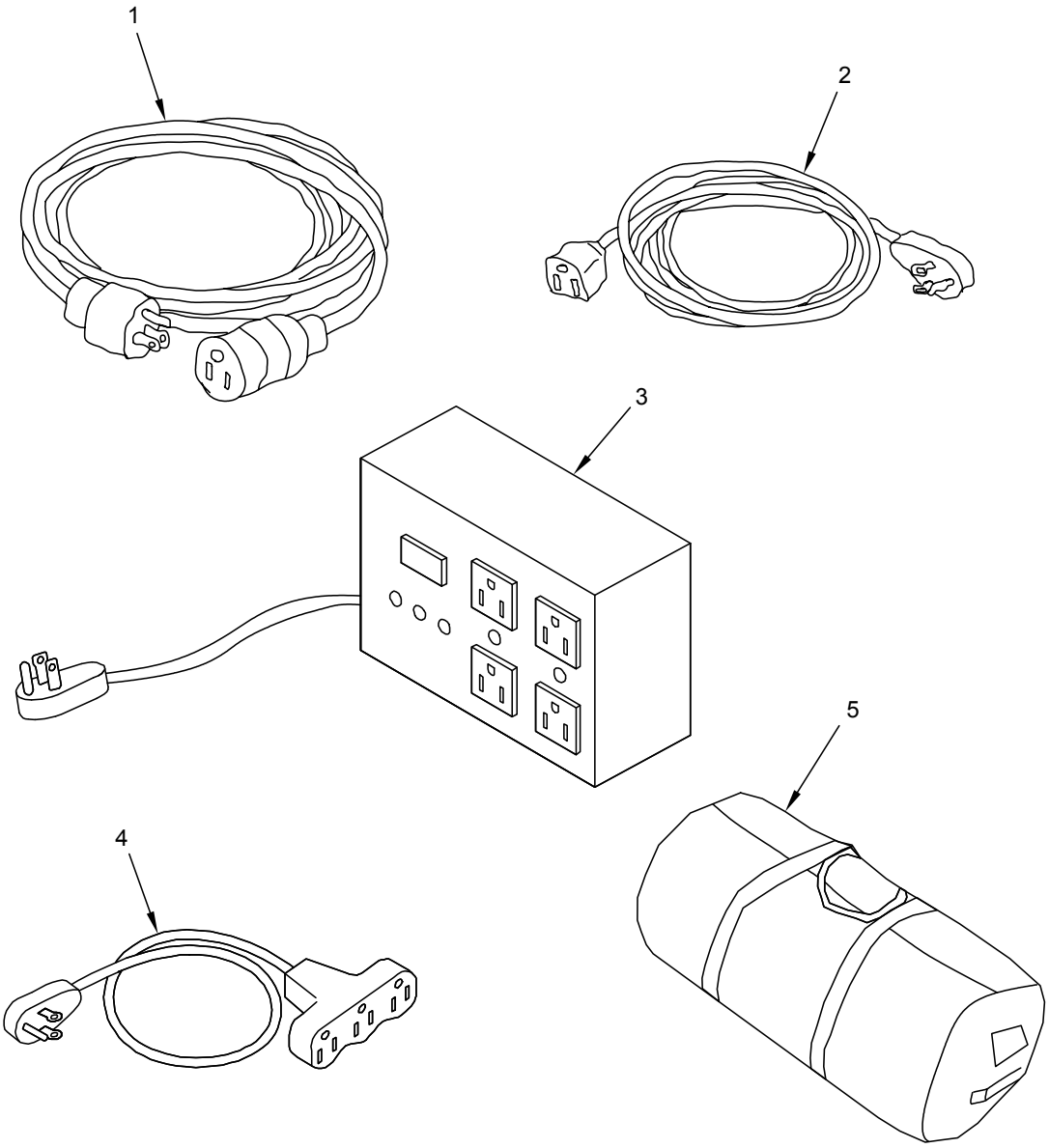


Figure 27. Wiring Kit, Electrical, T2-95205.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010601	
					FIGURE 27 WIRING KIT, ELECTRICAL T2-95205	
1	PAFZZ	6150-01-553-0094	0WFM3	T295114	CABLE ASSEMBLY,POWER, ELECTRICAL	1
2	PAFZZ	6150-01-552-6419	0WFM3	T295116	CABLE ASSEMBLY,POWER, ELECTRICAL	1
3	PAFZZ	5920-01-501-0678	65836	ISOBAR4	ARRESTER,ELECTRICAL SURGE.....	1
4	PAFZZ	6150-01-553-0088	1WXV7	SL-103-66593-01A	CABLE ASSEMBLY,POWER, ELECTRICAL	1
5	PAFZZ	8340-01-589-9618	0WFM3	MA100160	BAG,TENT FRAME PARTS	1
					END OF FIGURE	

PARTS INFORMATION
TMSS-MED
NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM
5920-00-010-6652	26	1
4730-00-014-4027	8	66
6240-00-019-3093	15	5
	19	1
5305-00-054-6668	6	34
5310-00-057-7080	22	16
5310-00-074-2328	22	24
3110-00-100-3541	21	2
5310-00-209-1761	22	13
5310-00-275-6635	22	11
5330-00-291-6658	22	8
5930-00-496-7492	6	6
5930-00-556-9791	6	14
4730-00-602-5342	8	32
6210-00-643-0339	15	4
6210-00-686-4999	15	24
5305-00-709-8423	22	6
5305-00-709-8542	22	26
5305-00-710-4205	22	5
5945-00-778-3922	6	36
4730-00-795-6959	8	80
5930-00-832-5174	6	1
6680-00-838-1829	8	69
3030-00-869-3419	7	10
5310-00-877-5795	22	1
4130-00-903-8372	4	36
6240-00-924-7526	19	2
5310-00-934-9748	6	13
5305-00-949-6184	22	25
5310-00-959-1488	22	15
5305-00-959-4158	4	9
2910-00-977-5495	8	93
5320-01-025-6328	8	17
	18	2
5925-01-040-7979	17	21
5925-01-043-9283	17	20
2510-01-050-7136	22	19
2530-01-050-7698	22	21
5310-01-050-8832	22	23
2530-01-050-8929	22	10
2540-01-051-6354	22	4
3120-01-052-1151	22	3
5365-01-053-6898	22	7
4730-01-053-8468	22	14

STOCK NUMBER	FIG.	ITEM
5360-01-054-2281	22	20
5935-01-097-9974	16	15
3020-01-099-6277	7	12
6210-01-108-2600	16	5
5999-01-113-0824	17	10
5920-01-123-5212	4	21
	8	44
5305-01-138-6292	6	9
5961-01-148-3364	6	27
5920-01-149-6952	4	22
	8	45
4820-01-165-7825	4	39
2530-01-167-1999	22	18
2530-01-192-8464	21	11
5330-01-226-8689	10	51
4210-01-259-5634	8	16
6645-01-263-9434	15	18
5340-01-267-2904	8	24
5920-01-285-9879	17	34
5315-01-308-1154	7	15
5340-01-315-8389	8	14
5920-01-327-2572	17	5
5930-01-330-2858	15	26
4820-01-333-6042	4	37
5340-01-334-5735	8	75
5940-01-337-3316	9	31
5940-01-338-1965	9	30
5940-01-349-6763	17	30
6220-01-359-2870	19	3
2530-01-375-8149	21	40
2530-01-375-8150	21	20
5340-01-385-9852	22	22
4730-01-399-1866	8	85
5120-01-399-9252	23	10
5950-01-412-4121	6	16
4730-01-424-5432	8	78
	13	15
5305-01-446-0679	6	21
2590-01-450-6882	10	76
5310-01-454-2325	21	35
5340-01-454-6358	21	34
5310-01-455-4394	21	9
5340-01-456-6458	22	17
2530-01-456-9099	21	33

STOCK NUMBER	FIG.	ITEM
2530-01-456-9107	21	36
2530-01-457-0173	21	41
5310-01-457-8573	21	48
2530-01-461-0178	21	28
5310-01-466-2747	10	62
5340-01-468-1309	4	2
5340-01-476-7532	18	29
4730-01-479-1934	13	12
5310-01-479-5890	5	9
	7	19
	18	39
	21	16
5330-01-480-0820	14	13
5920-01-480-3209	17	6
4010-01-481-1699	18	22
4730-01-481-4962	8	68
6140-01-482-9031	9	20
5310-01-485-7896	8	22
	18	25
8340-01-491-3057	2	7
4730-01-492-6678	4	19
	8	46
2530-01-493-5859	18	8
5340-01-497-5810	8	3
5310-01-497-7828	8	63
	14	1
5920-01-501-0678	27	3
5306-01-503-8991	21	47
5210-01-516-7126	18	16
5315-01-519-8470	21	12
5340-01-520-7456	4	53
5306-01-521-5240	13	9
5305-01-521-8564	21	18
2530-01-522-0151	21	21
5310-01-523-1028	8	57
3110-01-524-7337	21	3
5331-01-524-8032	21	10
5940-01-528-7120	17	28
5305-01-529-4402	4	50
5305-01-531-7264	8	90
5340-01-533-1330	8	6
5310-01-533-1836	21	8
5310-01-533-2191	8	40
4010-01-533-2369	15	8
5310-01-533-2915	8	19
	18	23
8340-01-533-5344	1	1
8340-01-533-5396	1	1
6110-01-533-9768	17	33

STOCK NUMBER	FIG.	ITEM
4730-01-534-5870	13	16
5340-01-535-4672	21	38
8340-01-538-1822	2	6
8340-01-538-1823	2	6
4730-01-539-9942	4	45
8340-01-540-7490	23	13
8340-01-540-7495	23	13
8340-01-540-7600	23	8
8340-01-540-7608	23	8
5306-01-547-7741	14	14
5306-01-547-8472	10	56
5306-01-547-8487	10	50
5340-01-547-8512	10	43
5330-01-547-8616	14	15
2815-01-548-4249	14	12
5310-01-548-4288	14	11
5340-01-548-4360	10	30
5365-01-548-4417	11	4
6210-01-549-6409	18	3
3110-01-550-0132	21	7
5920-01-552-0369	9	9
5305-01-552-0691	9	1
4730-01-552-0695	8	60
	13	14
5340-01-552-0719	4	13
5945-01-552-1084	10	8
6210-01-552-1327	6	5
6210-01-552-1332	6	4
5340-01-552-2466	15	1
4730-01-552-2772	4	23
	8	48
5310-01-552-2776	4	6
	5	1
	8	39
	9	6
	10	14
	13	4
	14	6
	18	38
5355-01-552-3328	5	3
5310-01-552-3971	10	34
5310-01-552-3975	9	14
5310-01-552-3984	4	15
	8	38
	9	16
	10	16
	13	3
5310-01-552-3984	14	23
	18	28

STOCK NUMBER	FIG.	ITEM
5305-01-552-3987	4	27
	8	55
	9	4
	14	7
5310-01-552-3994	9	5
	10	78
5305-01-552-4509	8	28
5310-01-552-4510	14	4
5306-01-552-4514	10	35
5330-01-552-4522	11	10
5310-01-552-4523	8	30
	16	9
5310-01-552-4536	14	8
4210-01-552-5109	8	18
4310-01-552-5118	12	2
6240-01-552-5498	16	6
6150-01-552-5717	9	3
3030-01-552-5720	11	15
6240-01-552-6210	15	25
6240-01-552-6217	26	3
6150-01-552-6221	9	7
5995-01-552-6224	18	10
6220-01-552-6229	18	3
5305-01-552-6246	2	10
5310-01-552-6251	2	13
5305-01-552-6254	18	5
2940-01-552-6301	10	7
2920-01-552-6309	10	2
2920-01-552-6314	10	21
2990-01-552-6325	4	18
	8	43
2930-01-552-6338	13	1
6150-01-552-6358	2	9
4730-01-552-6415	4	28
	8	53
6150-01-552-6419	27	2
2540-01-552-6428	18	14
5995-01-552-6934	8	37
5995-01-552-6935	8	34
5995-01-552-6936	18	10
5975-01-552-6937	18	30
2530-01-552-7040	21	27
2530-01-552-7044	21	42
5310-01-552-7435	6	32
6210-01-552-7806	26	2
5340-01-552-7835	5	6
5995-01-552-8232	8	35
3990-01-552-8296	2	4
5355-01-552-8299	6	7
5315-01-552-8301	23	26
5305-01-552-8305	24	14
5310-01-552-8308	10	23
5310-01-552-8314	8	88
	9	15
	10	19
	18	35
5315-01-552-8316	4	8
5310-01-552-8350	10	37
5310-01-552-8613	10	28
5310-01-552-8619	7	17
5306-01-552-8636	11	1
5306-01-552-8639	11	14
5306-01-552-8648	10	32
5306-01-552-8656	11	8
5306-01-552-8662	10	22
5306-01-552-8668	10	36
5305-01-552-8706	4	7
	5	2
5310-01-552-8714	10	40
	11	7
5306-01-552-8738	10	31
5306-01-552-9111	7	16
5340-01-552-9135	14	18
5306-01-552-9145	9	12
5305-01-552-9209	9	18
	13	6
	14	3
5940-01-552-9284	9	8
5940-01-552-9497	9	10
4730-01-552-9598	12	4
2910-01-552-9726	10	5
5330-01-552-9907	11	12
2815-01-552-9950	10	69
4720-01-552-9960	4	24
	8	49
2990-01-553-0029	14	28
2910-01-553-0046	4	29
	8	52
2910-01-553-0047	4	31
	8	54
8340-01-553-0054	23	7
6150-01-553-0088	27	4
6150-01-553-0094	27	1
4720-01-553-0305	13	17
2920-01-553-0314	10	29
5305-01-553-0345	8	25
5305-01-553-0345	16	13
5305-01-553-0350	7	14

STOCK NUMBER	FIG.	ITEM
	10	13
5310-01-553-0357	18	13
5310-01-553-0365	10	11
	14	10
5310-01-553-0366	18	4
5310-01-553-0370	6	28
	8	29
	10	68
	15	7
	17	11
5305-01-553-0377	10	12
	14	5
5305-01-553-0414	8	97
	9	13
4020-01-553-0415	23	25
5306-01-553-0517	18	36
5305-01-553-0673	23	15
6150-01-553-0934	9	11
2910-01-553-1272	10	63
6685-01-553-1277	11	11
6685-01-553-1307	10	1
2940-01-553-1319	12	3
5340-01-553-1413	23	14
6105-01-553-1609	7	20
5310-01-553-2165	14	9
5945-01-553-3177	10	15
6620-01-553-4096	10	6
5930-01-553-4145	10	25
2930-01-553-4605	11	13
5930-01-553-5296	10	4
4720-01-553-5758	3	2
4720-01-553-5827	3	3
5310-01-553-6196	10	61
5306-01-553-7509	18	37
5305-01-553-7511	23	19
4030-01-553-8070	18	17
5310-01-553-8822	18	7
5305-01-553-8832	18	15
5307-01-554-0463	21	5
5310-01-554-1192	2	11
	8	96
5340-01-554-2739	2	3
5306-01-554-4332	18	11
5305-01-554-5224	10	60
5310-01-555-6402	8	26
	15	30
	16	10
5310-01-555-7064	8	27
	15	29
	16	2
4730-01-556-5477	4	26
8340-01-556-7416	23	5
8340-01-557-3403	8	33
5340-01-558-6141	5	6
5365-01-558-6149	23	16
	24	21
5315-01-558-6154	18	19
5310-01-558-7178	8	89
	10	18
5310-01-558-7184	8	100
5306-01-558-7187	7	6
	18	40
	21	43
5305-01-558-7195	16	4
5307-01-558-7259	4	17
	8	42
5340-01-558-7288	23	28
5340-01-558-7292	23	23
	24	18
5340-01-558-7299	23	12
5340-01-558-7313	24	16
5340-01-558-7324	23	20
2540-01-558-7518	2	1
3010-01-558-7646	23	17
5305-01-558-7714	9	32
5305-01-558-7717	21	17
5310-01-558-7720	7	7
2540-01-558-8455	2	1
5340-01-558-8512	24	20
5340-01-558-8533	23	29
2540-01-558-8554	2	2
5340-01-558-8752	24	20
5340-01-558-8758	24	17
5340-01-558-8820	23	17
5340-01-558-8848	23	22
	24	8
5340-01-558-8873	24	10
5340-01-558-8890	23	16
	24	21
5340-01-558-9133	24	19
5340-01-558-9289	23	18
4720-01-558-9393	3	2
5340-01-558-9644	23	6
	24	12
5340-01-558-9652	23	18
5340-01-558-9666	24	15
5340-01-558-9677	24	19
5340-01-558-9804	23	29

STOCK NUMBER	FIG.	ITEM
5340-01-558-9807	23	21
6260-01-558-9867	18	9
6260-01-558-9874	18	1
5340-01-559-0471	23	27
5310-01-559-0602	18	41
	21	44
5305-01-559-0882	13	11
5310-01-559-1648	14	27
5365-01-559-2443	4	16
	8	41
5310-01-559-2446	2	12
	7	8
	8	95
	18	43
	21	46
4720-01-559-2546	3	3
5305-01-559-2700	8	62
5305-01-559-4711	10	17
4730-01-561-5843	8	91
5310-01-563-2566	8	20
	18	24
5305-01-564-6941	7	1
5330-01-567-5966	21	1
6645-01-567-8282	6	8
6625-01-567-9749	15	14
6625-01-567-9791	15	2
5925-01-567-9995	6	19
5925-01-567-9997	6	22
5925-01-568-0000	6	17
6250-01-568-0001	6	3
2530-01-568-0031	21	45
2530-01-568-0725	21	45
5310-01-568-0727	6	12
3110-01-568-0751	21	6
6250-01-568-1030	6	2
5305-01-568-1062	6	15
5999-01-568-1074	6	11
5925-01-568-1099	6	18
5355-01-568-3921	6	10
5305-01-568-3945	5	7
6230-01-568-4487	2	8
5305-01-568-4710	6	24
	8	15
	15	9
	17	24
4730-01-568-4716	8	94
5360-01-568-6048	21	22
5320-01-568-6990	4	46
4810-01-568-7071	4	41

STOCK NUMBER	FIG.	ITEM
3835-01-568-7074	4	38
4830-01-568-7079	4	43
5945-01-568-7389	6	26
5930-01-568-7446	6	31
6105-01-568-7464	7	5
5940-01-568-7575	6	30
5930-01-568-7581	4	33
5999-01-568-7586	6	33
5340-01-568-7761	4	32
9999-01-568-8609	4	40
5940-01-568-9122	17	25
5305-01-568-9387	7	3
4210-01-568-9442	4	20
	8	56
5305-01-568-9503	6	29
5930-01-568-9799	4	42
5935-01-568-9835	16	16
5925-01-569-0250	10	70
5930-01-569-0257	15	12
5930-01-569-0283	15	27
5925-01-569-0297	17	22
5950-01-569-0337	17	26
5330-01-569-0369	10	49
5310-01-569-0373	8	77
	16	3
5963-01-569-0378	17	2
5330-01-569-0380	10	48
5330-01-569-0386	10	42
2910-01-569-0390	10	47
5929-01-569-0391	17	19
5310-01-569-0403	10	85
5310-01-569-0412	10	81
5310-01-569-0415	10	83
5935-01-569-0794	16	14
4730-01-569-0826	10	58
5305-01-569-0831	10	84
5305-01-569-0843	10	82
4140-01-569-1023	7	11
2930-01-569-1146	4	44
5305-01-569-1152	4	52
4730-01-569-1177	4	48
5930-01-569-1334	15	16
6110-01-569-1448	17	16
5895-01-569-1469	17	31
5305-01-569-1758	15	32
5310-01-569-1766	16	11
5305-01-569-1777	15	31
5305-01-569-1782	15	33
5310-01-569-1792	15	6

STOCK NUMBER	FIG.	ITEM
5305-01-569-1803	8	13
	10	67
	17	17
5305-01-569-1811	16	17
5306-01-569-1824	10	86
5310-01-569-2130	8	12
	10	71
5307-01-569-2135	8	23
6625-01-569-2369	15	19
6625-01-569-2419	15	20
5895-01-569-2664	15	15
6130-01-569-2725	17	23
5895-01-569-2953	6	25
5340-01-569-2970	4	35
5895-01-569-3119	15	22
5895-01-569-3150	15	21
5895-01-569-3179	15	23
6625-01-569-3217	15	3
4930-01-569-3237	8	73
6625-01-569-3262	15	10
6620-01-569-3313	15	17
5315-01-569-3362	7	23
4730-01-569-4203	8	84
5310-01-569-4411	8	72
	17	12
5935-01-569-4429	16	12
5930-01-569-5312	15	13
5315-01-569-5347	22	28
5310-01-569-5414	8	21
	18	26
4730-01-569-5438	8	79
5305-01-569-5454	8	71
5340-01-569-5467	8	86
5340-01-569-5472	8	81
4810-01-569-5481	8	67
5340-01-569-5498	17	15
5305-01-569-5822	18	27
5999-01-569-5921	6	35
2530-01-569-5950	21	26
5310-01-569-5955	21	31
5305-01-569-5976	21	25
5310-01-569-5984	21	37
5310-01-569-5989	21	23
5340-01-569-5997	8	83
5360-01-569-6043	21	32
5360-01-569-6046	21	30
5360-01-569-6055	21	29
5970-01-569-6555	8	61
5305-01-569-6914	7	22

STOCK NUMBER	FIG.	ITEM
5305-01-569-7744	17	32
4730-01-569-7756	4	25
	8	50
5306-01-569-7926	10	45
5305-01-569-7811	17	13
5365-01-569-7918	10	55
6625-01-569-7929	15	11
5305-01-569-7937	8	87
4720-01-570-0575	8	101
4720-01-570-0499	8	47
5305-01-570-2471	8	99
5340-01-570-3916	9	29
5430-01-570-4415	23	24
1630-01-570-4484	21	4
4820-01-570-4489	8	74
4020-01-570-4924	23	3
5410-01-570-4998	23	5
5310-01-570-5969	10	66
	12	9
5310-01-570-5993	10	53
5306-01-570-6401	10	64
	11	5
4720-01-570-8936	8	59
5340-01-570-9063	22	12
8340-01-571-6274	23	11
8340-01-571-6456	25	3
8340-01-571-6458	24	2
8340-01-571-6590	24	9
8340-01-571-6673	25	8
8340-01-571-6878	24	4
8340-01-571-6948	23	4
8340-01-571-8798	24	1
8340-01-571-9444	25	4
8340-01-571-9552	24	7
8340-01-571-9659	25	9
8340-01-571-9776	24	3
8340-01-571-9853	24	11
8340-01-571-9871	24	6
8340-01-572-0253	2	2
8340-01-572-0505	24	2
8340-01-572-0624	25	3
8340-01-572-0658	24	1
8340-01-572-0722	25	6
8340-01-572-0876	25	10
5310-01-572-6753	10	79
8340-01-572-7030	25	7
8105-01-575-2509	3	4
6115-01-577-7123	10	80
4730-01-581-3294	8	92

STOCK NUMBER	FIG.	ITEM
5940-01-581-6740	9	26
6150-01-581-6746	9	24
6150-01-581-6751	9	22
5920-01-581-6929	9	25
5920-01-581-6939	9	23
5305-01-583-5489	8	2
2940-01-584-3314	12	1
8340-01-589-9473	24	13
8340-01-589-9512	23	1
8340-01-589-9518	23	1
5310-01-598-5134	21	49
5945-99-360-1748	17	9
5340-99-519-4305	17	1
5945-99-598-7263	17	14
2920-99-690-7498	17	3
2920-99-983-9545	17	7

PARTS INFORMATION
TMSS-MED
PART NUMBER INDEX

PART NUMBER	FIG.	ITEM
005-057-00	21	8
005-064-00	21	23
005-112-00	21	35
006-011-00	21	31
006-176-00	21	9
006-193-00	21	37
006T102	4	47
007-132-00	21	5
007-210-00	21	25
008-219-13	21	4
010-045-00	21	10
010-054-00	21	1
010-9229	10	8
010-9336	17	16
010-MACK1071	14	16
013T112	7	5
017T101	7	18
019-002-00	21	12
0203-8-10	8	94
021-039-00	21	11
021T116	4	8
024T115	4	4
02504-0	10	6
028050-6120	10	64
028050-6120	11	5
028050-8450	10	27
0-28080820-0	10	32
028080-8200	10	56
0-28080840-0	11	14
0-28080845-0	11	1
028080-8700	14	14
0-28081070-0	10	31
0-28181230-0	10	22
0-28680825-0	11	8
031-017-01	21	6
031-017-02	21	7
031-030-01	21	3
035T112	6	20
035T113	6	23
036-093-15	21	39
036-093-26	21	19
036220-4100	10	75
037-069-02	21	26
040-244-01	21	24
041010-6160	12	10
043-028-00	21	33
046-007-00	21	38
046-101-00	21	30
046-107-01	21	29
046-108-01	21	22
046-123-00	21	32
047-110-01	21	41
047-111-01	21	36
047-119-01	21	28
053T102	4	40
054-060-00	21	21
054-064-00	21	40
054-065-00	21	20
054T102	7	11
054T109	7	4

PART NUMBER	FIG.	ITEM
063T103	4	32
063T105	4	35
069-055-00	21	34
0708779	9	29
0737R	15	16
07415	18	3
081T102G	4	14
081T102T	4	14
081T106	7	2
087-001-00	21	18
088T101-32	6	7
088T103	4	12
089T108	6	25
0-91150208-0	10	40
0-91150208-0	11	7
091150-2080	14	11
0-91150210-0	10	28
091180-2080	10	53
1000861	6	11
1000902	6	33
1000905	4	44
1000947	4	42
1001136	22	28
100184	15	20
100222	15	18
1002330	21	45
1002331	21	45
1002532	8	102
1002533	8	104
1002734	8	76
1002735	8	76
1002754	4	5
1002756	4	10

PART NUMBER	FIG.	ITEM
1002757	4	1
1002758	4	3
1002761	4	5
1002763	4	10
1002764	4	1
1002765	4	3
1003392	10	24
1003631	8	65
1003632	8	64
1005514	20	1
1005629	22	2
1005995	22	2
1006024	5	4
1006025	5	8
1006026	5	5
1006230	10	73
1006873	8	1
1006874	8	1
1007205	2	15
1007206	2	15
1007404	8	9
1007405	8	9
1009000	16	8
1009749	7	9
1009832	22	9
1009833	22	9
1009945	22	27
1009946	22	27
1009994	8	5
1009995	8	5
100NLIT4	18	4
100T330	4	7
100T330	5	2

PART NUMBER	FIG.	ITEM
100T339	7	16
100T503	7	17
101038N	9	22
101038P	9	24
10-15-55P	9	21
101574	15	17
101586	15	19
102480	15	14
10332-04277	9	28
105038R	9	7
106538R	9	3
108038B	9	11
10896710	22	13
10C100HCS10	8	25
10C100HCS10	16	13
10C125MXP10	15	33
10C50MXP10	15	31
10C75HCS10	16	4
10CNFH1	16	11
10DLOC1	8	26
10DLOC1	15	30
10DLOC1	16	10
10DLOC10	8	77
10DLOC10	16	3
10DWFL1	8	30
10DWFL1	16	9
10DWFL10	8	27
10DWFL10	15	29
10DWFL10	16	2
10F37MXP1	6	15
1137084	21	51
1166-278	5	7
11674728	16	15
116C	8	79
116E	8	84
12-1004	9	35
123-1680562 PC 93	8	22
123-1680562 PC 93	18	25
12340842	8	16
12356014	22	18
12356017	22	23
12356018	22	20
12356020	22	17
12356021	22	7
12362746	22	12
12375837-BK-SP	18	3
12375841	19	3
12460176	18	8
1310763A	4	28
1310763A	8	53
13211E6931	6	1
1323580	6	30
1394	14	20
1434G	23	10
1441-10614	22	10
150072751	8	58
15K200140-53	9	2
16325-2	17	25
165-508-168	21	14
1771AS661-1	15	26
1804	22	21
1829	22	4
1844-2	22	19
18912	21	50
19411132M	16	7
197-DP-1207-FT120VAC	16	6

PART NUMBER	FIG.	ITEM
197-DP-287-FT28V DC	15	25
1EM94	9	9
218004	17	34
24032-2	12	5
24063	10	15
249-116	17	1
24AGM	9	27
25580	21	2
25C100HCS1	4	27
25C100HCS1	8	55
25C100HCS1	9	4
25C100HCS1	14	7
25C150HCS1	8	62
25C175HCS1	9	32
25C200HCS1	9	18
25C200HCS1	13	6
25C200HCS1	14	3
25C300HCS1	18	36
25C75HCS1W	7	14
25C75HCS1W	10	13
25CNNE1	4	15
25CNNE1	8	38
25CNNE1	9	16
25CNNE1	10	16
25CNNE1	13	3
25CNNE1	14	23
25CNNE1	18	28
25K100MX81	23	15
25K75MX71	23	19
25N62ZR5A	4	16
25N62ZR5A	8	41
25NLOC1	9	5
25NLOC1	10	78
25NWFL1	4	6
25NWFL1	5	1
25NWFL1	8	39
25NWFL1	9	6
25NWFL1	10	14
25NWFL1	13	4
25NWFL1	14	6
25NWFL1	18	38
280-326	17	8
280-610	17	7
281-326	17	4
281-329	17	29
281-402	17	30
281-512	17	6
281-610	17	3
281-901	17	28
282-200-7	8	61
283PSL1706	10	72
286-320	17	14
286-555	17	9
28957	7	1
29PSL020-33-500	4	34
30345T4	15	8
31C125HCS1/FT	7	3
31NLOC1	9	14
31NWFL1	14	4
3225T2	18	29
324444	10	51
330027	4	23
330027	8	48
33084	14	25
33817	21	48
33895	21	49

PART NUMBER	FIG.	ITEM
35360957	22	3
35512	14	2
36078	18	16
37C100HCS1	18	5
37C125HCS1	8	97
37C125HCS1	9	13
37C200HCS8Y/FT	21	17
37C200RFTB	8	23
37C300HCS1	18	37
37C75HCS1	10	17
37CNFH1	8	100
37NLOC1	8	89
37NLOC1	10	18
37NWFL1	8	88
37NWFL1	9	15
37NWFL1	10	19
37NWFL1	18	35
3RP1512-1AQ30	6	26
3SB3001-2DA41	6	10
3SB3001-6BA20	6	4
3SB3001-6BA40	6	5
3SB3400-1PB	6	3
3SB3400-1PC	6	2
41EB30AJ	6	36
42305T47	13	5
4282	10	84
438USA	17	10
43CNNE1	14	27
4568K173	8	68
484032	4	24
484032	8	49
49-6080	8	14
4C37MP10	16	17

PART NUMBER	FIG.	ITEM
5023298A	4	20
5023298A	8	56
50351MA-0-30KW	15	11
5036300V	15	10
50365A100A	15	2
5036HZ5565	15	3
50483931A	4	30
50483931A	8	51
50487171A	4	29
50487171A	8	52
50785K66	8	91
50900126A	8	47
509707-0051	10	43
50C125HCS1	8	99
50C150HCS1	7	6
50C150HCS1	18	40
50C150HCS1	21	43
50C175HCS1	2	10
50CNNE1	2	12
50CNNE1	7	8
50CNNE1	8	95
50CNNE1	18	43
50CNNE1	21	46
50N125WSP1	2	11
50N125WSP1	8	96
50NLOC1	2	13
50NWFL1	7	7
519316	16	14
52545-1	8	98
527-0116-00	4	53
5321K14	8	78
5321K14	13	15
5346K16	8	60

PART NUMBER	FIG.	ITEM
5346K16	13	14
5346K26	8	85
5346K66	4	45
5349	9	31
5350	9	30
53525K14	13	16
53525K18	8	92
53525K22	4	48
5388K18	4	19
5388K18	8	46
543-123	8	59
546-100-00T	17	26
5520K302	4	25
5520K302	8	50
5557-9	8	75
5724-050-B	9	10
5724-050-R	9	26
5726-050-R	9	8
5730-000R	9	34
58832	10	58
5SY4106-7	6	17
5SY4315-8	6	18
5SY4332-8	6	22
5SY4363-8	6	19
605-3008	16	16
60-B-176	4	49
62008	4	26
62-10-35	15	1
62-40-251-3	8	6
62-70-15	8	24
62-74-25	4	13
62C200HCS1	18	11
64010H B	13	12

PART NUMBER	FIG.	ITEM
65202400	10	10
70862	5	9
70862	7	19
70862	18	39
70862	21	16
720366-01	10	80
723272-02	10	87
72662	8	103
753-5147	15	15
760-4131#1408	22	22
79100204	13	8
7921K216	5	3
79600107	13	10
801125	10	86
80253	10	85
80277	10	11
80277	14	10
80C160HCS1933	10	12
80C160HCS1933	14	5
82149	10	82
8310084	21	47
83526	14	9
86116A	4	31
86116A	8	54
863-000309	18	22
8680-00032	8	69
87510	10	83
87511	10	81
8762000	22	14
894123-6231	10	77
894133-2075	10	76
894326-4390	10	48
894329-5490	10	74

PART NUMBER	FIG.	ITEM
894379-6880	10	50
8-94425751-1	10	63
894433-7171	10	45
8-94456741-2	10	7
897042-0280	14	15
8-97047604-0	10	2
897063-4003	11	4
897094-6411	12	8
897117-5901	14	12
897126-1860	14	13
897171-3310	10	49
8-97172549-0	10	5
897195-2593	10	46
897217-2492	10	41
8972248131	10	21
8-97224999-0	11	15
8-97226855-0	11	6
897227-2851	10	55
897227-6030	12	7
8-97229381-0	10	3
897231-5790	10	30
897232-3341	10	42
8-97233412-1	10	29
897247-9890	10	44
8-97254148-3	11	13
8-97258479-2	11	9
8-97264690-1	11	10
897289-2930	10	47
8-97289543-0	11	12
897314-8610	10	57
897329-6220	10	66
897329-6220	12	9
8-97361770-0	11	11

PART NUMBER	FIG.	ITEM
898096-5800	10	54
898097-1600	10	52
8C100MXP1	17	32
8C125MXP1	17	13
8C175MXP1	8	71
8C225MXP1	8	28
8C75MXP1	8	13
8C75MXP1	10	67
8C75MXP1	17	17
8CNFH1	15	6
8CNNE1	8	12
8CNNE1	10	71
8D50TXP1	24	14
8D50TXP10	8	2
8NLOC1	8	72
8NLOC1	17	12
8NWFL1	6	28
8NWFL1	8	29
8NWFL1	10	68
8NWFL1	15	7
8NWFL1	17	11
8W8X543	8	66
8X61	8	86
90257A029	8	63
90257A029	14	1
90313A109	8	57
9070T250D14	6	16
9-09111408-0	10	23
91202A234	10	61
91247A548	4	52
91249A196	6	29
91280A334	10	60
91771A207	15	32

PART NUMBER	FIG.	ITEM
91772A110	6	9
91772A144	6	21
91785A240	8	87
91887A	4	17
91887A	8	42
92141A006	6	32
92146A530	6	12
92198A679	14	24
92240A559	9	1
92311A578	7	22
92316A536	13	11
92497A350	10	79
92620A622	8	90
92700A459	17	15
92771A535	8	19
92771A535	18	23
92865A535	13	9
92865A540	4	50
92916A405	8	21
92916A405	18	26
92941A626	18	27
93475A250	10	62
93496A031	8	20
93496A031	18	24
94709A317	8	40
94800A730	14	8
97359A	4	18
97359A	8	43
97447A220	4	46
98493A117	7	15
98493A137	7	23
9-89136423-0	11	3
99051	9	12
9A34	9	33
9B1545	22	8
A28AA-28C	6	31
A600115	23	26
A600116	23	27
A600250	23	6
A600250	24	12
A601250	23	11
A601650	24	19
A601651	23	16
A601651	24	21
A601660	24	19
A601661	23	16
A601661	24	21
A601680	24	16
A601681	23	23
A601681	24	18
A602050	23	3
A602126	3	4
A602650	23	12
AA-44-D	8	17
AA-44-D	18	2
AA52463-A09	15	5
AA52463-A09	19	1
AA55569/01-005	4	21
AA55569/01-005	8	44
AA55569/01-008	4	22
AA55569/01-008	8	45
AC-13306	18	10
ADRSE-2-0/80-3/8ODF	4	39
AK54H	7	12
AX38	7	10
B1821BH044F200N	22	26

PART NUMBER	FIG.	ITEM
B1821BH044F350N	22	6
B402T	8	18
B472A	18	9
B472R	18	1
BH-2124	9	17
BK45X5/8	7	21
C2-32-35	4	2
C408115	2	3
CA11A204-600E	15	22
CA11US6512-600E	15	21
CA11US6522-600E	15	23
CD90555C32412S	16	12
CPBD-2	17	27
D30161-1584	15	13
D3085-2118-DHS	8	101
DL121	15	4
DP40-B	8	3
DYN3-60030	17	31
EFVE-1-L1	4	38
EFVE-5-CP100	4	43
EK-165S	4	36
F02A250V3A	26	1
F329601	24	6
F329631	24	7
F329751	24	11
F329781	24	9
F329905	23	22
F329905	24	8
F329908	24	10
FC602	22	11
FCB2DP	8	81
FCB3DP	8	83
FT55DL841	26	3

PART NUMBER	FIG.	ITEM
GMC-4A	17	5
H25MM	7	13
H300000	26	2
H300070	2	8
HKCS312G43EGWL	18	17
HW903-4024G	18	42
HW903-4024T	18	42
ISOBAR4	27	3
JA200881	23	29
JA200901	23	29
JA200921	23	28
JA200980	23	20
JA201000	23	18
JA201005	23	18
K71-394-00	21	42
K71-395-00	21	27
KBPC3501	6	27
M100-WA5	17	2
M45913/1-7FG5C	22	16
M45913/2-6FG5C	22	15
M5423/09-04	6	6
MA100130	25	3
MA100155	8	33
MA100160	27	5
MA100165	23	9
MA100170	26	4
MA100310	25	4
MA100530	25	3
MA100720	23	14
MA100735	23	5
MA100740	23	5
MACK1011	13	2
MACK1047	14	18

PART NUMBER	FIG.	ITEM
MACK1065	10	65
MACK1067	10	9
MACK1070	14	22
MACK1070A	14	21
MACK1072	14	19
MACK1078	13	17
MACK1079	13	13
MACK1180	13	1
MACK262	12	2
MACK906	10	1
MACK913	11	2
MACK922	12	3
MACK930	14	26
MACK932	14	28
MF300130	25	8
MF300140	25	6
MF300150	25	7
MF300160	25	10
MF300200	25	9
MFB736N9N02	9	25
MFC336175	9	23
MG27186	17	19
MS21044-N8	22	1
MS21083C7	22	24
MS24693-C273	4	9
MS25002-4	6	14
MS25331-2	15	24
MS25331-4	16	5
MS35649-244	6	13
MS51957-43	6	34
MS51975-2	22	25
MS90726-99	22	5
MXA1054G	23	8
MXA1054T	23	8
MXA1055G	23	13
MXA1055T	23	13
MXA2000G	2	6
MXA2000T	2	6
MXA2005G	25	2
MXA2005T	25	2
MXA2010W	25	1
MXA2015G	25	5
MXA2015T	25	5
MXA2016G	24	5
MXA2016T	24	5
MXA2020G	23	1
MXA2020T	23	1
MXA2025F	23	4
MXA2035G	23	2
MXA2035T	23	2
MXA2040B	23	7
MXA2045B	24	13
MXS1015G	24	1
MXS1015T	24	1
MXS1015W	24	4
MXS1020G	24	2
MXS1020T	24	2
MXS1020W	24	3
NN5811GR8Z	18	13
OE10S240	4	41
PCHA0131G	20	2
PCHA0131T	20	2
PCHA0161G	18	32
PCHA0161T	18	32
PCHA0171	18	19
PCHA0175G	18	12

PART NUMBER	FIG.	ITEM
PCHA0175T	18	12
PECU05T23B	6	35
PS-12750	9	20
QOU120	17	21
QOU330	17	20
QOU360	17	22
RE0062-0470	10	59
RV5100025C	4	37
S92D41	8	67
SDLA-350749	10	70
SE350	17	33
SH410-0001G	24	20
SH410-0001T	24	20
SH410-0001W	24	17
SH410-0201G	23	17
SH410-0201T	23	17
SH410-0201W	23	21
SH410-0202	23	24
SH410-0401R	24	15
SH535-0006	2	4
SH535-0007G	2	1
SH535-0007T	2	1
SH535-0008G	2	2
SH535-0008T	2	2
SK1036	8	93
SL-103-66593-01A	27	4
SLP2550	4	33
SM-2B-15FVTAU	10	4
SM82243ELACFPC	17	23
T20018C	18	7
T210949	18	34
T210965	18	18
T211205G	18	6

PART NUMBER	FIG.	ITEM
T211205T	18	6
T215125G	2	14
T215125T	2	14
T220034-1	15	28
T220035-1	16	1
T220076	9	19
T225250-5	8	7
T225453	8	8
T225853	8	11
T230007	10	20
T230019	8	74
T230020	8	73
T230050	13	7
T231250	14	17
T235005	8	32
T235064	8	4
T245264	8	36
T250250G	3	1
T250250T	3	1
T256250G	2	5
T256250T	2	5
T260487	15	12
T260605	17	18
T270034	18	15
T270130	6	24
T270130	8	15
T270130	15	9
T270130	17	24
T270923	23	25
T291433	3	2
T291434	3	3
T291527	3	2
T291528	3	3

PART NUMBER	FIG.	ITEM
T2-93000-1	2	7
T295004	2	9
T295101	8	34
T295111	8	35
T295114	27	1
T295116	27	2
T295145	8	37
T295146	18	30
T295153	18	14
T295154	18	33
T295161G	5	6
T295161T	5	6
T2-95205	26	5
T51E430	6	8
TG404-0819G	21	45
TG404-0819T	21	45
TG404-0829G	18	20
TG404-0829T	18	20
TG404-0830G	18	21
TG404-0830T	18	21
TG421-9000	8	31
TG421-9006G	18	31
TG421-9006T	18	31
TG423-0451-2G	5	4
TG423-0501-1G	5	5
TG423-0551-1G	5	8
TG423-0901	4	11
TG430-2005G	8	10
TG430-2005T	8	10
TG430-5001G	8	70
TG430-5001T	8	70
TG440-0001	10	26
TG903-5001	7	20
TG903-5103	21	15
TG903-6704	21	13
TG903-6752	18	10
TH2-16-002	8	80
TH3-21-002	8	82
TM-2A-230RAU	10	25
TMSS100G	1	1
TMSS100T	1	1
WFSAE127H2	18	41
WFSAE127H2	21	44
W-L-00111/64	19	2
X-09055-006	10	36
X-09055-048	10	35
X-09150-001	10	37
X-09150-002	10	34
X-09915-004	12	4
X-14111-050-0	12	6
X-14210-056	10	38
X-14210-057-0	12	1
X-14330186-0	10	33
X-14330-193	10	39
X-83121-014-0	10	69
XB5AS8445GCF	15	27
ZR72KCE-TF5-250	4	51

CHAPTER 10

DESTRUCTION OF EQUIPMENT TO PREVENT ENEMY USE FOR TMSS-MED

DESTRUCTION OF EQUIPMENT TO PREVENT ENEMY USE
TMSS-MED
GENERAL INFORMATION

SCOPE

This work package is for guidance of those whose duty it is to render inoperable or destroy equipment which is in imminent danger of capture by an enemy.

AUTHORIZATION

Only division or higher commanders have the authority to order destruction of equipment. They may however, delegate this authority to subordinate commanders when the situation demands it.

REPORTING DESTRUCTION

Destruction of equipment will be reported through command channels.

METHODS OF DESTRUCTION

Choose methods of destruction which will cause such damage that it will be impossible to restore the equipment to a usable condition within the combat zone. The following methods of destruction may be used separately or in combination, depending on the type of equipment and the degree to which each method is used.

Self-Destruction

Built-in self-destruction devices should be set off even if the major item containing equipment with self-destruction devices is to be destroyed. These devices should be permitted to do their work at least partially before incendiaries or explosives (especially the latter) are set off. Currently, the TMSS-MED contains no built-in self-destruction devices.

Improper Operation

The short circuiting of a power source and the application of an over voltage to equipment are examples of improper operation. This method of destruction has a limited application to electronics material.

Fire

The starting of fires on or near electronic equipment is particularly useful in destroying predominantly nonmetallic components such as transistors, diodes, resistors, capacitors, switches, and printed circuit boards. Fires should be lit after setting off explosives and/or completing mechanical destruction. Fires within partially closed cabinets tend to be less effective than open fires, since a closed area does not allow sufficient oxygen necessary for an intense flame. Heat sources which do not require an air supply, such as thermite-based devices or incendiary grenades, are not subject to this limitation. The use of fire is associated with numerous hazards, including the possibility of disclosing positions which are under enemy visual or infrared surveillance.

Weapons Fire

The use of weapons fire is less desirable than mechanical destruction, and is practically useless against heavy gauge metal panels and metal castings. However, optics such as night observation equipment are easily destroyed by correctly aimed gunfire.

Demolition (Explosives)

Explosives refer to TNT, plastic explosives, as well as fragmentation grenades. Explosives are most effective against structures and components which will not burn, or are too heavy or too strong to be easily demolished by mechanical means. The use of explosives has the disadvantage of possible disclosure of position when enemy forces are using sound-ranging-type equipment.

Mechanical Destruction

Mechanical destruction includes smashing electronic components, bending chassis or sub chassis, slashing cables and wiring, or any similar action. Dropping a weight on equipment and throwing lightweight equipment over a cliff are also examples of mechanical destructions. Sledges, hammers, axes or heavy tools are examples of the implements which can be used. Mechanical destruction should be completed before fires are lit.

Use of Natural Surroundings

The disposal or denial to the enemy of electronics material may be accomplished in the field by taking advantage of the natural surroundings and environment.

Submergence of equipment and repair parts under water (lakes, ponds, streams, etc), concealment by hiding material in caves or, preferably burial can be used effectively. Where the surrounding area does not lend itself to such disposal, widely dispersed scattering of material, preferably, into heavy underbrush, can serve as a denial or delaying measure in the event the area is recaptured.

CLASSIFIED EQUIPMENT

Classified equipment must be destroyed to such a degree as to prevent duplication by, or revealing means of operation or function to the enemy.

ASSOCIATED CLASSIFIED DOCUMENTS

Any classified documents, notes, instructions, or other written material pertaining to function, operation, maintenance, or employment, including drawings or parts lists, must be destroyed in a manner to render them useless to the enemy.

END OF WORK PACKAGE

DESTRUCTION OF EQUIPMENT TO PREVENT ENEMY USE
TMSS-MED
DESTRUCTION PROCEDURES

SCOPE

This work package is for guidance of those whose duty it is to render inoperable or destroy the TMSS-MED which is in imminent danger of capture by an enemy.

METHOD OF DESTRUCTION

Command decision, according to the tactical situation will determine when the using organization is to destroy a TMSS-MED. A destruction plan will be prepared by the using organization, unless one was prepared by a higher authority. For general vehicle destruction procedures, refer to TM 750-244-6, Procedures for Destruction of Tank Automotive Equipment to Prevent Enemy Use (U.S. Army Tank-Automotive and Artillery Command).

TMSS-MED EQUIPMENT DESTRUCTION PROCEDURES

The following procedures should be followed when time does not permit critical equipment to be destroyed individually.

Demolition/Explosives

WARNING

Personnel should stand clear of area being destroyed be weapons fire. Always use a weapon of a caliber sufficient to ensure enough penetration to achieve the desired damage and to eliminate the possibility of ricochet. Personnel unfamiliar with explosives should not set or detonate explosives.

The use of explosives has the disadvantage of possible disclosure of position.

The TMSS-MED can be destroyed using incendiary grenades, several rounds of properly aimed weapons fire, or a sufficient amount of explosives. When placing explosives, they should be placed within the Genset and ECU enclosures and under the TMSS-MED shelter.

Use incendiary grenade by pulling pin and placing directly on top of engine and/or generator and on top of ECU compressor.

Additional charges can be placed on the trailer tongue, on top of the chassis frame, and on the axle to prevent enemy use of the trailer.

Puncture trailer tires and remove trailer lunette assembly.

WARNING

Toxic fumes may result from burning electrical equipment found in the Genset and ECU. Fires should be lit only in open areas. Avoid inhaling fumes from burning components.

Fire

Fires should be started after setting off explosives. Gasoline, kerosene, diesel, or oil may be used to destroy smaller components such as the TMSS-MED shelter and accessories.

END OF WORK PACKAGE

CHAPTER 11

SUPPORTING INFORMATION FOR TMSS MED

SUPPORTING INFORMATION
TMSS-MED
REFERENCES

SCOPE

This work package lists all field manuals, forms, military standards, technical manuals, and miscellaneous publications referenced in this manual

FIELD MANUALS

FM 3-5	NBC Decontamination
FM 4-25.11	First Aid
FM 21-305	Manual for the Wheeled Vehicle Driver

GOVERNMENT PUBLICATIONS

AR 25-2	Information Assurance
AR 700-138	Army Logistics Readiness and Sustainability
CECOM TR-98-6	Earth Grounding and Bonding Pamphlet
DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Forms 2404 and 5988E	Equipment Inspection and Maintenance Worksheet
DA Form 2408-9	Equipment Control Record.
DA Form 7399	Survey/Decontamination Record
DA Form 7399-R	Survey/Decontamination Record
DA Form 7400	Record of Area/Equipment Survey
DA Form 7401	Radioactive Commodity Report
DA PAM 700-48	Handling Procedures for Equipment Contaminated with Depleted Uranium or Radioactive Commodities
DA PAM 700-138	Army Logistics Readiness and Sustainability
DA PAM 750-8	The Army Maintenance Management System (TAMMS) Users Manual
DA PAM 738-751	Functional Users Manual for the Army Maintenance Management System - Aviation (TAMMS-A)
DD Form 361	Transportation Discrepancy Report
SF 368	Product Quality Deficiency Report

TECHNICAL BULLETINS

TB 43-0134	Technical Bulletin Battery Disposition and Disposal
TB MED 507	Heat Stress Control and Heat Casualty Management

TECHNICAL MANUALS

TM 11-5820-1118-12&P	Operator and Unit Maintenance Manual (including Repair Parts and Special Tools List) MK-2551A/U (SWGS) Grounding Kit
TM 9-2330-392-14&P	Operator's, Unit, Direct Support and General Support Maintenance Manual (Including Repair Parts and Special Tools List) Trailer, Cargo: Light, 2-Wheel M1101 (2330-01-387-5443) EIC: CBC; Trailer, Cargo: Heavy, 2-Wheel M1102 (2330-01-387-5426) EIC: CBB; Chassis, Trailer: 2-Wheel (2330-01-387-5424) EIC: CCL
TM 750-244-2	Procedures for Destruction of Electronic Material to Prevent Enemy Use
TM 750-244-6	Procedures for Destruction of Tank Automotive Equipment to Prevent Enemy Use (US Army Tank-Automotive Command)

END OF WORK PACKAGE

SUPPORTING INFORMATION
TMSS-MED
MAC INTRODUCTION

MAINTENANCE ALLOCATION CHART (MAC)

INTRODUCTION

The Army Maintenance System MAC

This introduction provides a general explanation of all maintenance and repair functions authorized at the two maintenance levels under the Two-Level Maintenance System concept.

The MAC (immediately following the introduction) designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

Field – includes three sub columns, Crew maintenance (C), Service maintenance (O), and Field maintenance (F).

Sustainment – includes two sub columns, Below Depot (H) and Depot (D).

The tools and test equipment requirements (immediately following the MAC) list the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.

The remarks (immediately following the tools and test equipment requirements) contain supplemental instructions and explanatory notes for a particular maintenance function.

Maintenance Functions

Maintenance functions are limited to and defined as follows:

1. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel). This includes scheduled inspection and gauging and evaluation of cannon tubes.

2. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e. load testing of lift devices and hydrostatic testing of pressure hoses.

3. Service. Operations required periodically to keep an item in proper operating condition; e.g., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases. This includes scheduled exercising and purging of recoil mechanisms. The following are examples of service functions:

a. Unpack. To remove from packing box for service or when required for the performance of maintenance operations.

b. Repack. To return item to packing box after service and other maintenance operations.

c. Clean. To rid the item of contamination.

d. Touch up. To spot paint scratched or blistered surfaces.

e. Mark. To restore obliterated identification.

Maintenance Functions – Continued

4. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.

5. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

6. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments of test, measuring, and diagnostic equipment used in precision measurements. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

7. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

8. Paint (ammunition only). To prepare and spray color coats of paint so that the ammunition can be identified and protected. The color indicating primary use is applied, preferably, to the entire exterior surface as the background color of the item. Other markings are to be repainted as original so as to retain proper ammunition identification.

9. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.

10. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

NOTE

The following definitions are applicable to the "repair" maintenance function:

Services. Inspect, test, service, adjust, align, calibrate, and/or replace.

Fault location/troubleshooting. The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT).

Disassembly/assembly. The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).

Actions. Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

11. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

12. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

Explanation of Columns in the MAC

Column (1) Group Number. Column (1) lists Functional Group Code (FGC) numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).

Column (2) Component/Assembly. Column (2) contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

Column (3) Maintenance Function. Column (3) lists the functions to be performed on the item listed in column (2). (For a detailed explanation of these functions refer to "Maintenance Functions" outlined above).

Column (4) Maintenance Level. Column (4) specifies each level of maintenance authorized to perform each function listed in column (3), by indicating work time required (expressed as man-hours in whole hours or decimals) in the appropriate subcolumn. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate work time figures are to be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

Field:
C Operator or Crew maintenance
O Service maintenance
F Field maintenance

Sustainment:
L Specialized Repair Activity
H Below Depot maintenance
D Depot maintenance

NOTE

The "L" maintenance level is not included in column (4) of the MAC. Functions to this level of maintenance are identified by a work time figure in the "H" column of column (4), and an associated reference code is used in the REMARKS column (6). This code is keyed to the remarks and the SRA complete repair application is explained there.

Column (5) Tools and Equipment Reference Code. Column (5) specifies, by code, those common tool sets (not individual tools), common Test, Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.

Column (6) Remarks Code. When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries.

Explanation of Columns in Tools and Test Equipment Requirements

Column (1) Tool or Test Equipment Reference Code. The tool or test equipment reference code correlates with a code used in column (5) of the MAC.

Column (2) Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

Explanation of Columns in Tools and Test Equipment Requirements – Continued

Column (3) Nomenclature. Name or identification of the tool or test equipment.

Column (4) National Stock Number (NSN). The NSN of the tool or test equipment.

Column (5) Tool Number. The manufacturer's part number, model number, or type number.

Explanation of Columns in the Remarks

Column (1) Remarks Code. The code recorded in column (6) of the MAC.

Column (2) Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

END OF WORK PACKAGE

SUPPORTING INFORMATION
TMSS-MED
MAINTENANCE ALLOCATION CHART (MAC)

Table 1. MAC for TMSS Medium.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT		TOOLS AND TEST EQUIPMENT REF CODE	REMARKS CODE
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	CREW C	SERVICE O	FIELD F	BELOW DEPOT H	DEPOT D		
00	POWER PLANT, UTILITY PU-821/T PU-822A/T	INSPECT	0.10						A, B
		REPAIR		1.00				1	C
		REPAIR			3.00				J
		REPAIR					*		X
01	TENT, MODULAR, GENERAL PURPOSE SYSTEM TMSS100G TMSS100T	INSPECT	0.10						A, B
		REPAIR		1.00				1	C
		REPAIR			3.00				J
		REPAIR					*		X
0101	AIR CONDITIONER	INSPECT	0.20						D, E
		TEST	0.20						H
		SERVICE	0.20						G
		SERVICE		0.30				1	A, F, G
		REPLACE		1.00				1	
		REPAIR		0.10				1	J
		SERVICE			1.00			1,3,7,9,10	Y
		REPAIR			1.00			1,3,6-12	J
		REPAIR					*		X
010101	AIR CONDITIONER ENCLOSURE	INSPECT	0.10						A
		REPLACE		0.30				1	
		REPAIR		1.00				1	J
		TEST			1.00			2	Z
		REPAIR			1.00			1, 3,6-12	J
01010101	PANEL, EVAPORATOR ASSEMBLY	INSPECT	0.10						A
		REPLACE		0.20				1	
		REPAIR		0.30				1	J
01010102	CONTROL, ENCLOSURE, AIR CONDITIONER	INSPECT	0.10						A
		ADJUST	0.10						N
		REPAIR		0.10				1	J
		TEST			1.00			2	Z
		REPAIR			1.00			1	J
		REPLACE					*		X
		REPAIR					*		X

Table 1. MAC for TMSS Medium – Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT		TOOLS AND TEST EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	CREW C	SERVICE O	FIELD F	BELOW DEPOT H	DEPOT D	REF CODE	REMARKS CODE
01010103	BLOWER ASSEMBLY	INSPECT	0.10						A
		ADJUST		0.10				1	I
		REPLACE		0.20				1	
		REPAIR		0.30				1	J
		TEST			1.00			2	Z
		REPAIR			1.00			1	J
		REPAIR					*		X
0102	GENERATOR, DIESEL ENGINE	INSPECT	0.10						A,L,M
		SERVICE	0.10						G, K, P
		ADJUST	0.10						V
		REPAIR		0.30				1	J
		TEST			1.00			2	Z
		REPLACE			1.00			1	
		REPAIR			1.00			1, 2, 4	J
		REPAIR					*		X
010201	BATTERY ASSEMBLY	INSPECT	0.10						A
		TEST	0.20						U
		REPLACE		0.70				1	
		REPAIR		0.70				1, 2	J
010202	ENGINE/ GENERATOR ASSEMBLY	TEST		0.20				1,2	Z
		REPAIR		1.00				1, 2	J
		TEST			0.20			1,2	Z
		REPLACE			3.00			1,5	
		REPAIR			1.00			1, 2, 4	J
01020201	COOLING SYSTEM, INSTALLATION	INSPECT	0.10						A
		ADJUST		0.20				1	AA
		REPLACE		1.00				1	
		REPAIR		1.00				1	J

Table 1. MAC for TMSS Medium – Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT		TOOLS AND TEST EQUIPMENT REF CODE	REMARKS CODE
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	CREW C	SERVICE O	FIELD F	BELOW DEPOT H	DEPOT D		
01020202	AIR INTAKE ASSEMBLY	INSPECT	0.10						A
		REPAIR		0.10				1	J
		REPAIR					*		X
010203	RADIATOR INSTALLATION	INSPECT	0.10						A
		SERVICE	0.10						G
		REPLACE		1.00				1	
		REPAIR		1.00				1	J
		REPAIR					*		X
010204	EXHAUST ASSEMBLY	INSPECT	0.10						A
		REPLACE		0.70				1	
		REPAIR		1.00				1	J
010205	CONTROL PANEL	INSPECT	0.10						A
		REPAIR		0.10					AB
		TEST			0.10			2	Z
		REPAIR			1.00			1, 2, 4	J
010206	POWER DISTRIBUTION PANEL	INSPECT	0.10						A
		REPAIR		0.10					AB
		TEST			0.10			2	Z
		REPAIR			1.00			1, 2, 4	J
010207	BARRIER PANEL	INSPECT	0.10						A
		REPAIR		0.10				1	W
		TEST			1.00			2	Z
		REPAIR			1.00			1, 2, 4	J
		REPAIR					*		X
0103	CHASSIS, TRAILER ASSEMBLY	INSPECT	0.10						A, Q
		TEST	0.10						R
		ADJUST	0.10						S
		SERVICE	0.20						G
		REPAIR		0.80				1, 2	J, T
		REPAIR			1.00			1	J
		REPAIR					*		X

Table 1. MAC for TMSS Medium – Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT		TOOLS AND TEST EQUIPMENT REF CODE	REMARKS CODE
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	CREW C	SERVICE O	FIELD F	BELOW DEPOT H	DEPOT D		
010301	STOP LIGHT, VEHICULAR	INSPECT	0.10						A
		REPLACE		0.30				1	
		REPAIR		0.20					J
010302	TONGUE JACK ASSEMBLY	INSPECT	0.10						A
		REPLACE		0.30				1	
		REPAIR		0.20				1	J
010303	BRAKE INSTALLATION	INSPECT	0.10					1	Q
		REPLACE			3.00			1	
		REPAIR			1.00			1	J
01030301	ACTUATOR ASSEMBLY	INSPECT	0.10						A
		REPLACE			1.00				
		REPAIR			1.00				J
0104	TENT	INSPECT	0.20						A
		REPLACE	0.50						
		REPAIR	0.50						J
		REPAIR					*		X
010401	TENT, END CAP	INSPECT	0.10						A
		REPLACE	0.50						
		REPAIR	0.50						J
010402	TENT, ROOF AND SIDES	INSPECT	0.10						A
		REPLACE	0.70						
		REPAIR	0.50						J
0105	POWER DISTRIBUTION UNIT, 60 AMP	INSPECT	0.10						A
		REPLACE		0.10					
		REPAIR					*		X
0106	LIGHT SET, TENT	INSPECT	0.10						A
		REPLACE		0.20					
		REPAIR		0.20					J
010601	WIRING KIT, ELECTRICAL	INSPECT	0.10						A
		REPLACE		0.20					
		REPAIR		0.20					J

Table 2. Tools and Test Equipment for TMSS Medium.

TOOL OR TEST EQUIPMENT REF. CODE	MAINTENANCE LEVEL	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
1	O, F	TOOL KIT, GENERAL MECHANIC'S	5180-01-483-0249	SC-5180-95-B47
2	O, F	MULTIMETER	6625-01-265-6000	27 W/ACCE
3	F	TOOL KIT, SERVICE, REFRIGERATION UNIT	5180-00-596-1474	SC-5180-95-N18
4	F	TOOL KIT, ELECTRONIC, TK-105 A/G	5180-01-460-9328	5180-91-CL-R64
5	F	STANDARD AUTOMOTIVE TOOL SET	4910-01-490-6453	4910-95-A81
6	F	NITROGEN PRESSURE REGULATOR	6680-00-503-1327	
7	F	REFRIGERANT RECOVERY/RECYCLING UNIT	4130-01-338-2707	
8	F	PUMP, VACUUM	4130-00-289-5967	
9	F	CHARGING MANIFOLD, R407C TYPE		MASTER COOL PN 96561-G
10	F	CHARGING CYLINDER, RECOVERY TANK	4330-01-387-1501	
11	F	VALVE CORE REMOVER/INSTALLER		MASTER COOL PN: 91496
12	F	QUICK RELEASE VALVE SET		MASTER COOL PN: 90262

Table 3. Remarks for TMSS Medium.

REMARKS CODE	REMARKS
A	Visual inspection of assembly and components for damage, loose or missing hardware.
B	Inspect for proper ground connection.
C	Repair by replacement of power distribution unit (PDU) assembly, 25' PDU cable assembly, lights assembly, and fuel supply/return line.
D	Inspect ECU enclosure drain ports and air return duct filters for obstruction or damage.
E	Inspect condenser and evaporator coils for dirt/dust.
F	Service by cleaning condenser coil, or filters.
G	Preventive Maintenance Checks and Services (PMCS).
H	Test air conditioner assembly heating and cooling function.
I	Adjust evaporator fan belt to proper tension.
J	Repair by replacement of assemblies, subassemblies, and components.
K	Service generator by priming fuel system.
L	Inspect generator engine assembly for coolant leaks and proper oil and coolant levels. Inspect for proper oil pressure and coolant temperature.
M	Check for damaged or frayed cables, loose connections at alternator, starter, and starter solenoid. Check condition of engine fan belt.
N	Adjust ECU control panel by setting ECU thermostat to appropriate temperature setting.
O	Not used.
P	Service generator engine assembly by charging batteries.
Q	Inspect trailer assembly for surge brake fluid level, service brake operation, parking brake operation, and proper tire air pressure.
R	Test trailer brake lights, running lights, turn signals, and hazard lights operation.
S	Adjust parking brakes for proper operation.
T	Refer to TM 9-2330-392-14&P for Wheel and Tire Assembly replacement.
U	Test batteries for proper voltage by observing voltage meter on Genset control panel.
V	Adjust Genset output voltage.
W	Repair by replacement of fuses.
X	Sustainment Maintenance performed by Field Service Representatives or Depot Maintenance Teams.
Y	Service by recovery and recharge of air conditioner coolant.
Z	Test electrical continuity and/or functionality of circuit.
AA	Adjust fan belt to proper tension.
AB	Repair by replacement of indicator bulbs.

END OF WORK PACKAGE

SUPPORTING INFORMATION
TMSS-MED
COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS

INTRODUCTION

Scope

This work package lists COEI and BII for the TMSS-MED to help you inventory items for safe and efficient operation of the equipment.

General

The COEI and BII information is divided into the following lists:

Components of End Item (COEI). This list is for information purposes only and is not authority to requisition replacements. These items are part of the TMSS-MED. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Items of COEI are removed and separately packaged for transportation or shipment only when necessary. Illustrations are furnished to help you find and identify the items.

Basic Issue Items (BII). These essential items are required to place the TMSS-MED in operation, operate it, and to do emergency repairs. Although shipped separately packaged, BII must be with the TMSS-MED during operation and when it is transferred between property accounts. Listing these items is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE. Illustrations are furnished to help you find and identify the items.

Explanation of Columns in the COEI List and BII List

Column (1) Illus Number. Gives you the number of the item illustrated.

Column (2) National Stock Number (NSN). Identifies the stock number of the item to be used for requisitioning purposes.

Column (3) Description, Part Number/(CAGEC). Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The stowage location of COEI and BII is also included in this column. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).

Column (4) Usable on Code. When applicable, gives you a code if the item you need is not the same for different models of equipment.

Code	Used on
89W	Power Plant, Utility, PU-821/T, Green
89X	Power Plant, Utility, PU-822A/T, Tan

Column (5) (U/I). Unit of Issue (UI) indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (2).

Column (6) Qty Rqr. Indicates the quantity required.

COMPONENTS OF END ITEM

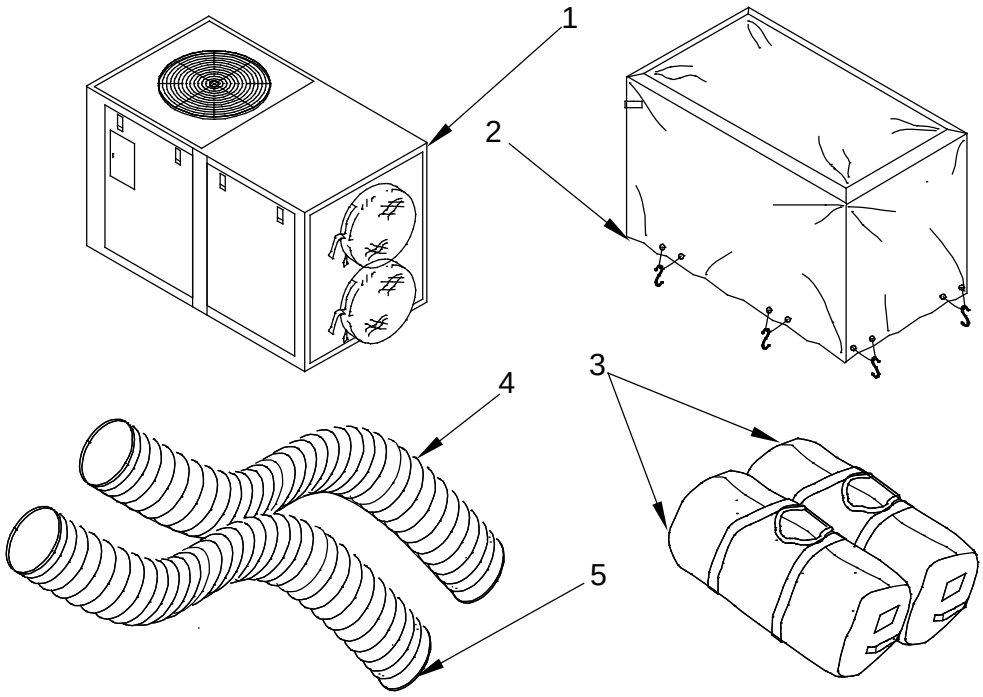


Table 1. Components of End Item List.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
1		AIR CONDITIONER [GREEN] T25050G, (0WFM3)	89W	EA	1
		AIR CONDITIONER [TAN] T25050T, (0WFM3)	89X	EA	1
2	2540-01-558-8455	TARPAULIN [GREEN] SH535-0007G, (0WFM3)	89W	EA	1
	2540-01-558-7518	TARP, TAN SH535-0007T, (0WFM3)	89X	EA	1
3	8105-01-575-2509	BAG, DUCT A602126, (0WFM3)	89W, 89X	EA	2
4	4720-01-553-5827	DUCT, AIR RETURN [GREEN] T291434, (0WFM3)	89W	EA	1
	4720-01-559-2546	DUCT, AIR RETURN [TAN] T291528, (0WFM3)	89X	EA	1
5	4720-01-553-5758	DUCT, AIR SUPPLY [GREEN] T291433, (0WFM3)	89W	EA	1
	4720-01-558-9393	DUCT, AIR SUPPLY [TAN] T291527, (0WFM3)	89X	EA	1

COMPONENTS OF END ITEM – Continued

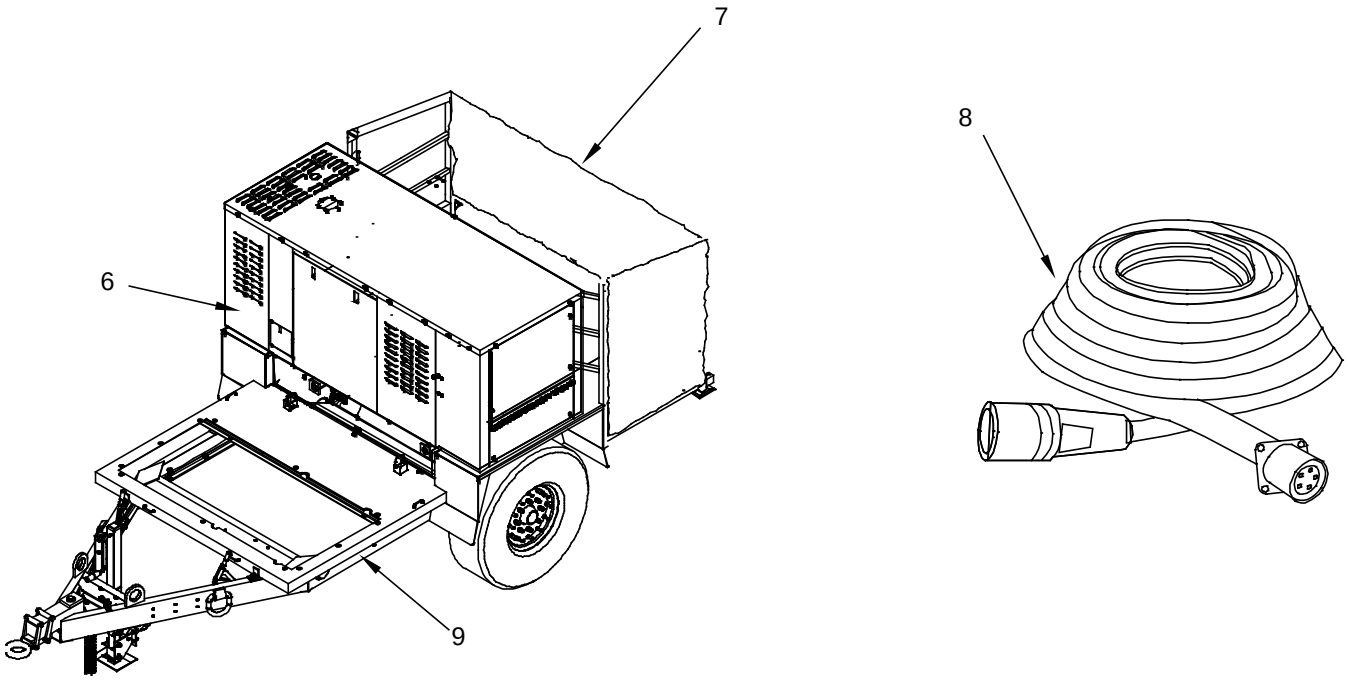


Table 1. Components of End Item List – Continued.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
6		GENERATOR, DIESEL ENGINE [GREEN] 1007206, (0WFM3)	89W	EA	1
		GENERATOR, DIESEL ENGINE [TAN] 1007205, (0WFM3)	89X	EA	1
7	8340-01-572-0253	TARPAULIN [GREEN] SH535-0008G (0WFM3)	89W	EA	1
	2540-01-558-8554	TARPAULIN [TAN] SH535-0008T (0WFM3)	89X	EA	1
8	6150-01-552-6358	CABLE ASSEMBLY, POWER, ELECTRICAL T295004, (0WFM3)	89W, 89X	EA	1
9		CHASSIS, TRAILER ASSEMBLY [GREEN] T215125G, (0WFM3)	89W	EA	1
		CHASSIS, TRAILER ASSEMBLY [TAN] T215125T, (0WFM3)	89X	EA	1

COMPONENTS OF END ITEM – Continued

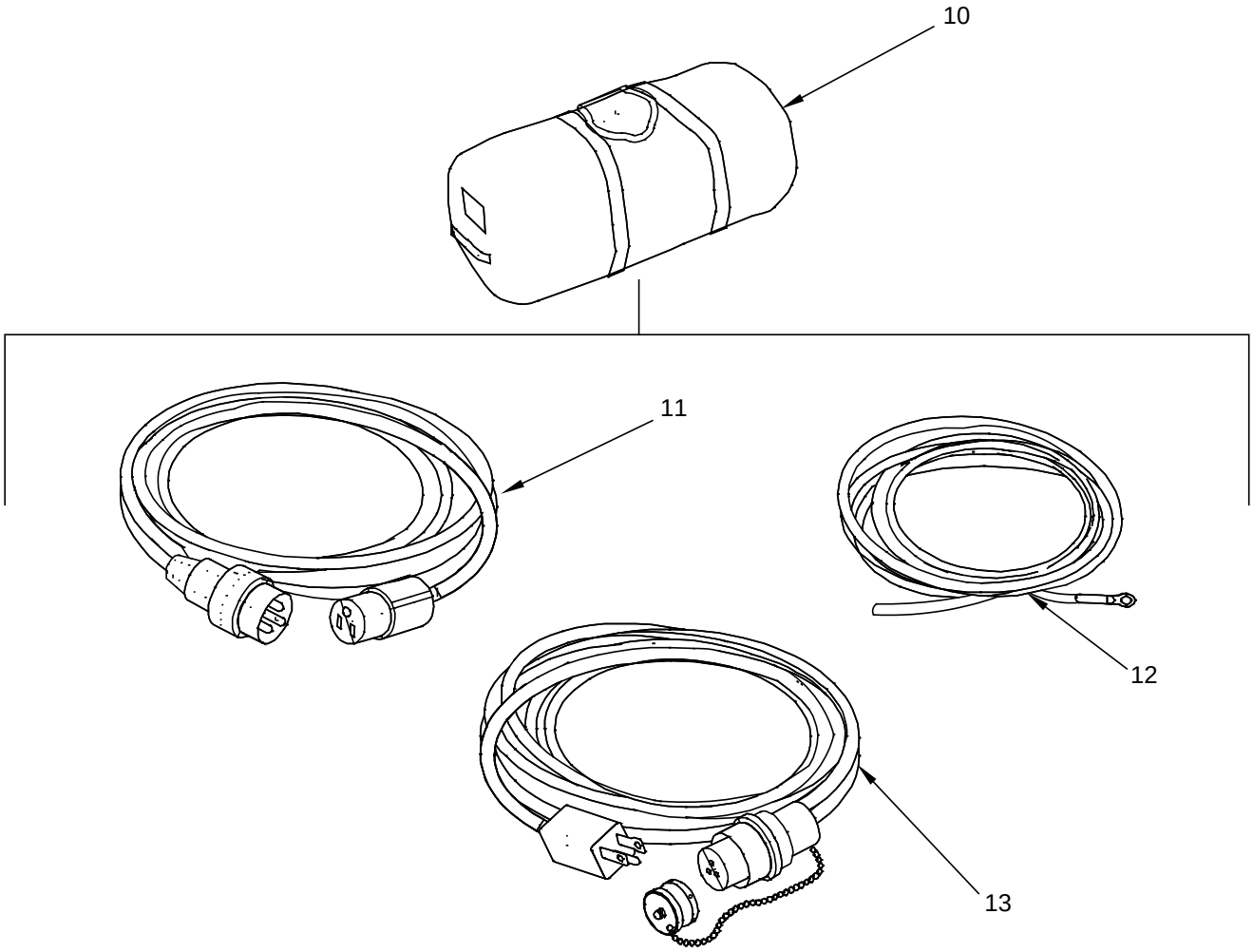


Table 1. Components of End Item List – Continued.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
10	8340-01-557-3403	BAG, TENT FRAME PARTS MA100155, (0WFM3)	89W, 89X	EA	1
11	5995-01-552-6935	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL T295101, (0WFM3)	89W, 89X	EA	1
12	5995-01-552-6934	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL T295145, (0WFM3)	89W, 89X	EA	1
13	5995-01-552-8232	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL T295111, (0WFM3)	89W, 89X	EA	1

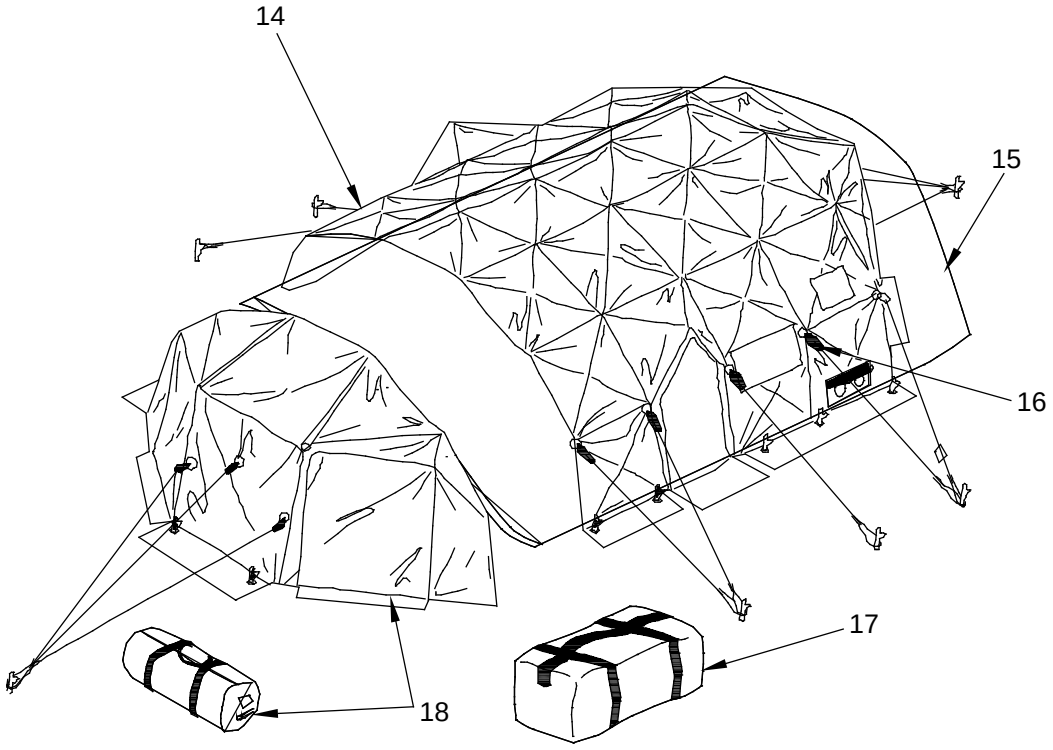


Table 1. Components of End Item List – Continued.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
14		TENT, ROOF AND SIDES [GREEN] MXA2035G, (0WFM3)	89W	EA	1
		TENT, ROOF AND SIDES [TAN] MXA2035T, (0WFM3)	89X	EA	1
15	8340-01-571-6948	FLOOR, TENT MXA2025F, (0WFM3)	89W, 89X	EA	1
16	4020-01-570-4924	ROPE, FIBROUS A602050, (0WFM3)	89W, 89X	EA	16
17	8340-01-553-0054	CASE, TENT MXA2040B, (0WFM3)	89W, 89X	EA	1
18	8340-01-589-9512	BAG, TENT FRAME PARTS [GREEN] MXA2020G, (0WFM3)	89W	EA	2
	8340-01-589-9518	BAG, TENT FRAME PARTS [TAN] MXA2020T, (0WFM3)	89X	EA	2

COMPONENTS OF END ITEM – Continued

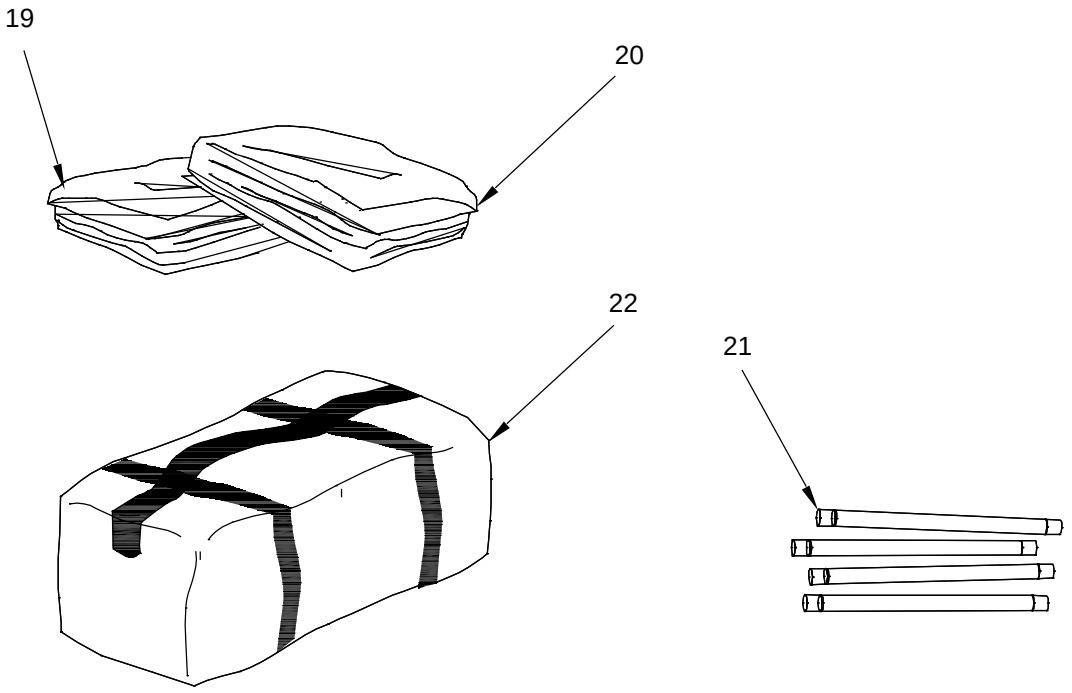


Table 1. Components of End Item List – Continued.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
19	8340-01-540-7600	CONNECTOR, TENT GUSSET [GREEN] MXA1054G, (0WFM3)	89W	EA	4
	8340-01-540-7608	CONNECTOR, TENT GUSSET [TAN] MXA1054T, (0WFM3)	89X	EA	4
20	8340-01-540-7490	PASSAGEWAY, TENT [GREEN] MXA1055G, (0WFM3)	89W	EA	1
	8340-01-540-7495	PASSAGEWAY, TENT [TAN] MXA1055T, (0WFM3)	89X	EA	1
21	5340-01-558-7299	POLE, PUSH A602650, (0WFM3)	89W, 89X	EA	4
22	8340-01-556-7416	REPAIR KIT, COVERS [GREEN] MA100735, (0WFM3) (See WP 0168 for expendable items list)	89W	EA	1
	5410-01-570-4998	KIT, REPAIR [TAN] MA100740, (0WFM3) (See WP 0168 for expendable items list)	89X	EA	1

COMPONENTS OF END ITEM - Continued

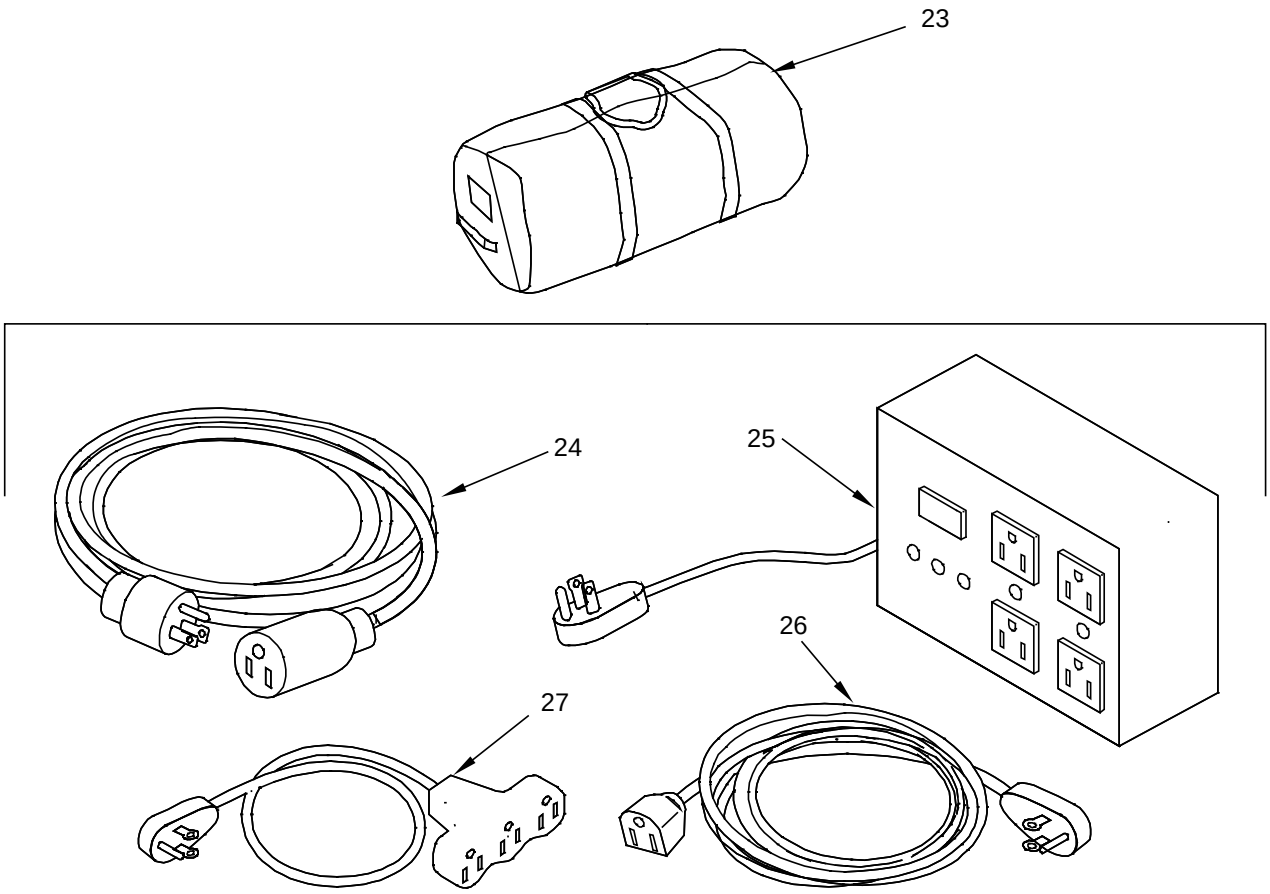


Table 1. Components of End Item List – Continued.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
23	8340-01-589-9618	BAG, TENT FRAME PARTS MA100160, (0WFM3)	89W, 89X	EA	1
24	6150-01-553-0094	CABLE ASSEMBLY, POWER, ELECTRICAL T295114, (0WFM3)	89W, 89X	EA	1
25	5920-01-501-0678	ARRESTER, ELECTRICAL SURGE ISOBAR4, (65836)	89W, 89X	EA	1
26	6150-01-552-6419	CABLE ASSEMBLY, POWER, ELECTRICAL T295116, (0WFM3)	89W, 89X	EA	1
27	6150-01-553-0088	CABLE ASSEMBLY, POWER, ELECTRICAL SL-103-66593-01A, (1WXV7)	89W, 89X	EA	1

COMPONENTS OF END ITEM – Continued

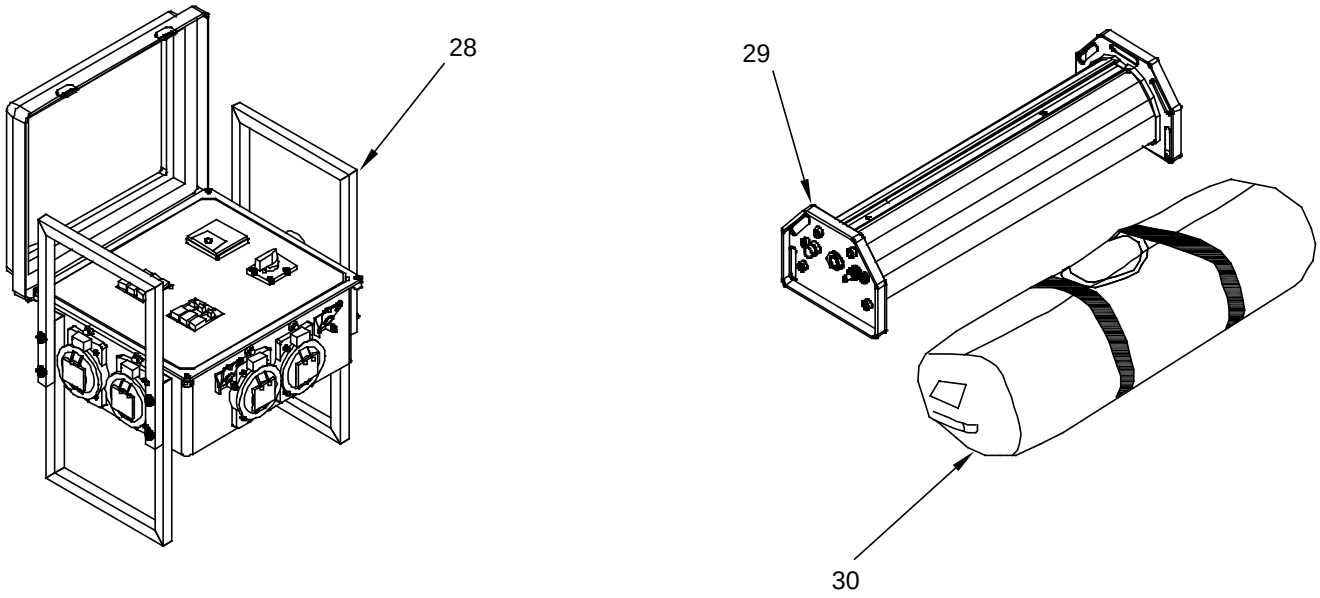


Table 1. Components of End Item List – Continued.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
28	8430-01-491-3057	POWER DISTRIBUTION UNIT, TENT T2-93000-1, (0WFM3)	89W, 89X	EA	1
29	6210-01-552-7806	FIXTURE, LIGHTING H300000, (0WFM3)	89W, 89X	EA	4
30		BAG, LIGHTING MA100170, (0WFM3)	89W, 89X	EA	2

BASIC ISSUE ITEMS

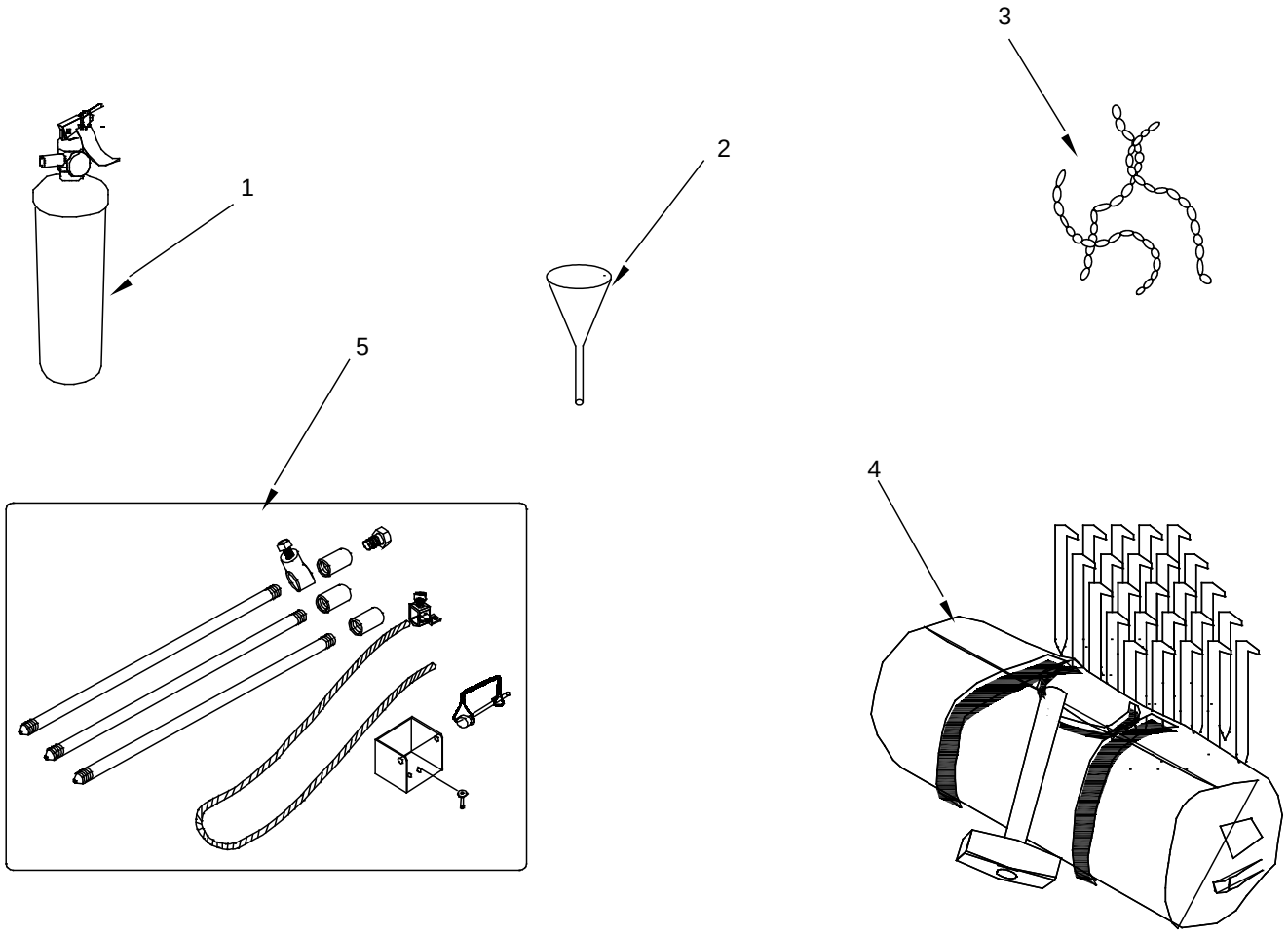


Table 2. Basic Issue Items.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
1	4210-01-552-5109	EXTINGUISHER, FIRE B402T, (49376)	89W, 89X	EA	1
2		FUNNEL T295169, (0WFM3)	89W, 89X	EA	1
3	5340-01-558-9644	ADAPTER, TIE-DOWN A600250, (0WFM3)	89W, 89X	EA	3
4	8430-01-467-9179	STEEL STAKE PIN SET MA100760, (0WFM3)	89W, 89X	KT	1
5	5975-01-552-6937	GROUND ROD KIT T295146, (0WFM3)	89W, 89X	KT	1

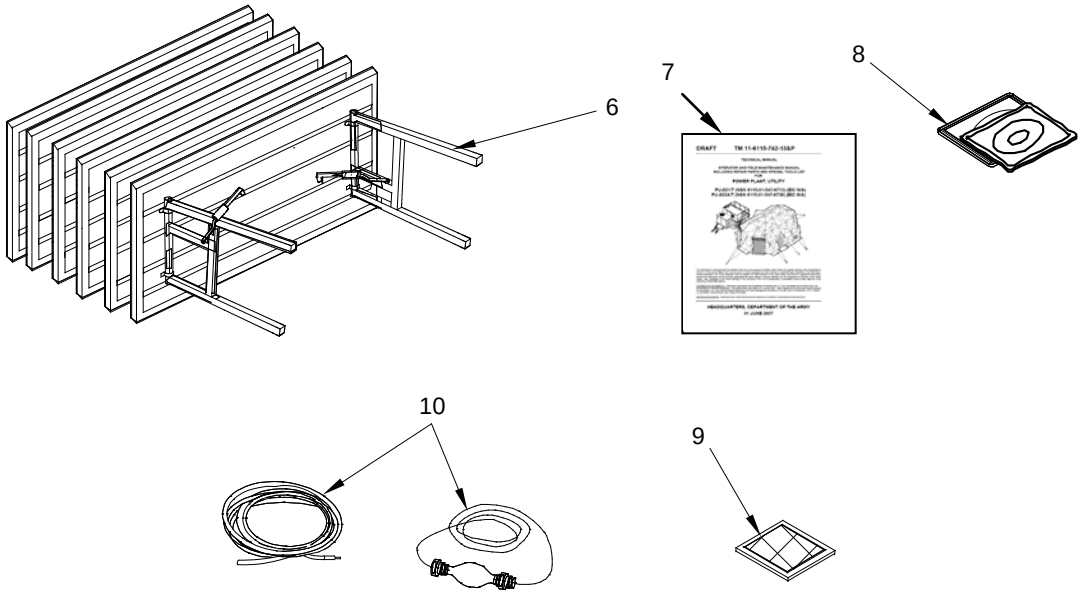


Table 2. Basic Issue Items – Continued.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
6		TACTICAL UTILITY FIELD FURNITURE BP900A001, (0WFM3)	89W, 89X	EA	6
7		TECHNICAL MANUAL & RPSTL (TM 11-6115-742-13&P)	89W, 89X	EA	1
8		COMPACT DISC (CD-ROM) WARRANTY A602260, (0WFM3)	89W, 89X	EA	1
9	4910-01-301-9125	PAN, DRAIN 4204T4, (39428)	89W, 89X	EA	1
10		FUEL LINES, AUXILIARY T295180, (0WFM3)	89W, 89X	SE	1

END OF WORK PACKAGE

SUPPORTING INFORMATION
TMSS-MED
ADDITIONAL AUTHORIZATION LIST (AAL)

INTRODUCTION

Scope

This work package lists additional items you are authorized for the support of the TMSS-MED.

General

This list identifies items that do not have to accompany the TMSS-MED and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

Explanation of Columns in the AAL

Column (1) National Stock Number (NSN) - Identifies the stock number of the item to be used for requisitioning purposes.

Column (2) Description, Part Number/(CAGEC) - Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).

Column (3) Usable on Code - When applicable, gives you a code if the item you need is not the same for different models of equipment.

Code	Used on
89W	Power Plant, Utility, PU-821/T, Green
89X	Power Plant, Utility, PU-822A/T, Tan

Column (4) Unit of Issue (U/I) - Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (1).

Column (5) Qty Recm - Indicates the quantity recommended.

ADDITIONAL AUTHORIZED LIST ITEMS

Table 1. Additional Authorized List.

(1) National Stock Number (NSN)	(2) Description, Part Number/(CAGEC)	(3) Usable On Code	(4) U/I	(5) Qty Recom
8340-01-537-8797	BOOTING COLLAR, VEHICLE, GREEN FOR 1068 SH540-0205G, (0WFM3)	89W	EA	A/R
8340-01-537-8793	BOOTING COLLAR, VEHICLE, TAN FOR 1068 SH540-0205T, (0WFM3)	89X	EA	A/R
8340-01-537-8740	BOOT WALL, GREEN FOR COMMAND POST SYSTEM MODULAR, SH540-0001G, (0WFM3)	89W	EA	A/R
8340-01-537-8738	BOOT WALL, TAN FOR COMMAND POST SYSTEM, MODULAR, SH540-0001T, (0WFM3)	89X	EA	A/R

Table 1. Additional Authorization List – Continued.

(1) National Stock Number (NSN)	(2) Description, Part Number/(CAGEC)	(3) Usable On Code	(4) U/I	(5) Qty Recom
8340-01-537-8769	BOOTING COLLAR,VEHICLE,GREEN FOR V1-V5 SH540-0208G, (0WFM3)	89W	EA	A/R
8340-01-537-8767	BOOTING COLLAR,VEHICLE,TAN FOR V1-V5 SH540-0208T, (0WFM3)	89X	EA	A/R
8340-01-587-8352	CONNECTOR, BOOTWALL, TAN, SIDE-TO SICPS, OR END-TO-SICPS JS900340 (OWFM3)	89X	EA	A/R
8340-01-587-8327	CONNECTOR, BOOTWALL, WHITE, SIDE-TO-SICPS OR END-TO-SICPS JS900360 (0WFM3)	89X	EA	A/R
8340-01-588-2488	CONNECTOR, SET, J/MX SHELTER, SIDE-TO-SIDE OR END-TO-SICPS, TAN 1006160 (0WFM3)	89X	EA	A/R
8340-01-540-7690	CONNECTOR SET, (SIDE TO SIDE) TMSS-MED, GREEN, MXA1055G, (0WFM3)	89W	EA	A/R
8340-01-540-7495	CONNECTOR SET, (SIDE TO SIDE) TMSS-MED, TAN, MXA1055T, (0WFM3)	89X	EA	A/R
8340-01-540-0855	SEAM REINFORCEMENT SYSTEM (SRS), WHITE MXA1056, (0WFM3)	89W, 89X	EA	A/R
8340-01-540-7600	CONNECTOR SET, (END TO END) TMSS-MED, GREEN, MXA1054G, (0WFM3)	89W	EA	A/R
8340-01-540-7608	CONNECTOR SET, (END TO END) TMSS-MED, TAN, MXA1054T, (0WFM3)	89X	EA	A/R
	GROUND ROD DRIVER 5/8” TG903-7000 (OWFM3)	89X	EA	A/R
CONNECTOR SET(s), TMSS-LRG				
	CONNECTOR SET, GREEN MXS1051G, (0WFM3)	89W	EA	A/R
	CONNECTOR SET, TAN MXS1051T, (0WFM3)	89X	EA	A/R
	CONNECTOR SET, WHITE MXS105W, 0WFM3)	89W, 89X	EA	A/R

Table 1. Additional Authorization List – Continued.

(1) National Stock Number (NSN)	(2) Description, Part Number/(CAGEC)	(3) Usable On Code	(4) U/I	(5) Qty Recom
CONNECTOR SET(s), CPP RWS				
	BOOTWALL, CONNECTOR SET, GREEN MXA1040G, (0WFM3)	89W	EA	A/R
5411-01-565-5225	HARDWARE, for BOOTWALL, CONNECTOR SET, GREEN, MXA1041G, (0WFM3)	89W	EA	A/R
	BOOTWALL, CONNECTOR SET, TAN MXA1051T, (0WFM3)	89X	EA	A/R
	HARDWARE, for BOOTWALL, CONNECTOR SET, TAN, MXA1041T, (0WFM3)	89X	EA	A/R
5830-01-528-2498	CHAIR, FOLDING (3MYY8) 12586 or equivalent	89W, 89X	EA	20
7810-01-075-8135	CARABINER [D-Ring] (52403) 662-847	89W, 89X	EA	30
NA	TABLE, UTILITY FIELD BP300A005, (0WFM3)	89W, 89X	EA	A/R
6150-01-333-1655	POWER STRIP, ELECTRICAL OUTLET UL620-15, (65836)	89W, 89X	EA	5
1095-00-407-0674	RACK, STORAGE SMALL ARMS M12 8449880, (19204)	89W, 89X	EA	A/R
5680-01-553-8745	FLOORING SHEET, MODULAR BTS-ICMS, (1PR05) [4'LX3.5'WX2"H W/CABLE CHANNELS] SAND	89W, 89X	EA	A/R
5680-01-553-8740	FLOORING SHEET, MODULAR BTS-NICMS, (1PR05) [4'LX3.5'WX2"H WO/CABLE CHANNELS] SAND	89W, 89X	EA	A/R
COMMAND OR ACCESS CONTROL TENT				
8340-01-F00-9891	TENT SICPS-SMALL, GREEN SH202-0001G, (0WFM3)	89W	EA	1
8340-01-F00-4360	TENT SICPS-SMALL, TAN SH202-0001T, (0WFM3)	89X	EA	1
8340-01-F00-9890	TENT SICPS-SMALL, GREEN SH202-0003G, (0WFM3) (W/EMI)	89W	EA	A/R
8340-01-F00-9889	TENT SICPS-SMALL, TAN SH202-0003T, (0WFM3) (W/EMI)	89X	EA	A/R

Table 1. Additional Authorization List – Continued.

(1) National Stock Number (NSN)	(2) Description, Part Number/(CAGEC)	(3) Usable On Code	(4) U/I	(5) Qty Recom
SHELTER OR TENT RIGID DOORWAY				
NA	ENTRY CONTROL POINT 1009460, (0WFM3) [DOOR AND FRAME]	89W, 89X	EA	A/R

END OF WORK PACKAGE

SUPPORTING INFORMATION
TMSS-MED
EXPENDABLE AND DURABLE ITEMS LIST

INTRODUCTION

Scope

This work package lists expendable and durable items that you will need to operate and maintain the TMSS-MED. This list is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V Repair Parts, and Heraldic Items), CTA 50-909, Field and Garrison Furnishings and Equipment, or CTA 8-100, Army Medical Department Expendable/Durable Items.

Explanation of Columns in the Expendable/Durable Items List

Column (1) Item Number. This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item (e.g., sealing compound (WP 0165, Item 38)).

Column (2) Level. This column identifies the lowest level of maintenance that requires the listed item (C = Operator/Crew; O = Unit/AMC, F= Direct Support/ASB).

Column (3) National Stock Number (NSN). This is the NSN assigned to the item which you can use to requisition it.

Column (4) Item Name, Description, Part Number/(CAGEC). This column provides the other information you need to identify the item. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parenthesis).

Column (5) (U/I). Unit of Issue (U/I) code shows the physical measurement or count of the item, such as gallon, dozen, gross, etc.

EXPENDABLE AND DURABLE ITEMS LIST

Table 1. Expendable and Durable Items List.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, Part Number/(CAGEC)	(5) U/I
1	O	6810-00-075-5546	Alcohol, Isopropyl 7618-19-4 (53390)	BT
2	O		Anti-Freeze,	
		6850-00-664-1403	1-Gallon (3.78 L) Bottle D3306, (81346)	GL
		6850-00-664-1409	55-Gallon (20.19 L) Drum D3306, (81346)	GL
3	O	8030-00-105-0270	Antiseize Compound NSBT-16N, (5W425)	LB
4	O	6515-01-234-6838	Applicator, Disposable 362 (5L934)	PG

EXPENDABLE AND DURABLE ITEMS LIST – Continued

Table 1. Expendable and Durable Items List – Continued.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, Part Number/(CAGEC)	(5) U/I
5	O		Blade, hack saw 4202A18, (39428)	PG
6	C	9150-01-102-9455	Brake Fluid, Silicone, Automotive, All Weather, Operational and Preservative, 1-Gallon (3.78 L) Bottle MIL-B-46176 (81349)	GL
7	F	3439-00-188-6982	Brazing alloy, (Copper) 3132, (70334)	CO
8	F	3439-00-528-3882	Brazing, alloy, (Silver) QQ-B-654, (81348)	TO
9	O	7920-00-514-2417	Brush, Acid, Swabbing 803-12 (7S147)	GR
10	C		Brush[1, 2] SH903-9000, (0WFM3)	EA
11	O	6850-01-474-2302	Cleaning Compound, Solvent, MIL-PRF-680 (81349)	GL
12	O	5350-00-192-5047	Cloth, Abrasive (80 grit) 051144-02460 (76381)	PG
13	O	5350-00-174-1000	Cloth, Abrasive (Waterproof) A-A-1200, (58536)	BD
14	C	7920-00-044-9281	Cloth, Cleaning MIRACLEWIPEL001, (51200)	BX
15	F	3439-01-324-8208	Desoldering Wick 80-2-5 (21267)	EA
16	O	7930-00-056-8144	Detergent, General Purpose Formula409-2202 (93098)	BX
17	C		Duct Tape, Green, [1, 2] 2 inch x 12 yards (50.8 mm x 10.97 m) A601350, (0WFM3)	RO
18	C		Duct Tape, Tan, 2 inch x 12 yards[1,2] 2 inch x 12 yards (50.8 mm x 10.97 m) A601360, (0WFM3)	RO
19	C		Fabric, Self-Adhesive, Green[1,2] C424017, (0WFM3)	EA
20	C		Fabric, Self-Adhesive, Tan[1,2] C424018, (0WFM3)	EA

EXPENDABLE AND DURABLE ITEMS LIST – Continued

Table 1. Expendable and Durable Items List – Continued.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, Part Number/(CAGEC)	(5) U/I
21	C		Fabric, Self-Adhesive, White[1,2] C424019, (0WFM3)	EA
22	F	3439-00-914-8390	Flux, brazing, (use w/ aluminum, brass, copper and steel), O-F-499, (81348)	JR
23	F	3439-00-009-8808	Flux, Soldering (electronic) FLUX R 1QT (81349)	QT
24	C	8415-01-463-5928	Gloves, Rubber , Multipurpose 8415-01-463-5928, (80244)	DZ
25	O	9150-01-305-6879	Grease, Automotive & Artillery, 14 oz Cartridge MIL-G-10924C, (81349)	EA
26	O	4720-01-221-8870	Hose, Nonmetallic 5/8 inch (15.875 mm) ID 28417, (24161)	RO
27	O		Hose, Nonmetallic 3/4 inch (19.05 mm) ID 65009, (04NP0)	RO
28	O		Hose, Nonmetallic 3/8 inch (9.5252 mm) ID 65213, (04NP0)	RO
29	O		Hose, Nonmetallic 5/16 inch (7.94 mm) Dia 535-278, (04NP0)	RO
30	O		Hose, Non-metallic, 50-feet (15.24 m) 7454T16, (39428)	EA
31	F	5970-01-326-1660	Insulation Kit, Sleeving, Thermal FIT-105-MS-1 (92194)	EA
32	F		Insulation Sleeving, Thermal (2 inch W x 30 feet L x 1/8 inch Thk) (50.8 mm W x 9.14 m L x 3.175 mm Thk) 014T101 (3C0M7)	RO
33	F		Insulation Sleeving, Thermal, 5/8 inch ID x 1/2 inch wall (15.875 mm ID x 12.7 mm wall) 014T110 (3C0M7)	RO
34	F		Insulation Sleeving, Thermal, 1-3/8 inch ID x 1/2 inch wall 014T111 (3C0M7)	RO

EXPENDABLE AND DURABLE ITEMS LIST – Continued

Table 1. Expendable and Durable Items List – Continued.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, Part Number/(CAGEC)	(5) U/I
35	C	9150-01-152-4117	Lubricating Oil, Engine, 1-Quart (0.947 L) M2104-1-15W40, (81349)	QT
36	C	9150-00-402-4478	Lubricating Oil, Engine, 1-Quart (0.947 L) EMERY3908D, (33358)	QT
37	O	9150-01-035-5392	Lubricating Oil Gear, GO 80W-90, 1-Quart (0.947 L) M2105-1-80W90, (81349)	CN
38	O	9150-01-035-5393	Lubricating Oil, Gear, GO 80W-90, 5-Gallon (18.90 L) MIL-L-2105-3-80W90, (81349)	CN
39	O	9150-01-035-5394	Lubricating Oil, Gear, GO 80W-90, 55-Gallon (208.19 L) Drum M2105-4-80W90, (81349)	DR
40	F	6830-00-292-0732	Nitrogen, Technical Pumped (89783)	CY
41	F	5350-00-598-5537	Paper, Abrasive, Garnet P-P-105 (81348)	HD
42	F	5350-00-186-8819	Paper, Abrasive, (220 grit) P-P-121 (81348)	PG
43	F	5975-01-481-4497	Protector, Electrical Cable 1/2 inch (12.7 mm) black 863-000669, (4X630)	RO
44	F	5975-01-481-4499	Protector, Electrical Cable 1/4 inch (6.35 mm) black 863-000670, (4X630)	RO
45	F		Protector, Electrical Cable 5/8 inch (15.875 mm) black CLT62N-C630, (06383)	RO
46	C	7920-01-447-3002	Rags, Wiping, Absorbent 41200, (0W517)	
47	F		Refrigerant, (R-407c)	

EXPENDABLE AND DURABLE ITEMS LIST – Continued

Table 1. Expendable and Durable Items List – Continued.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, Part Number/(CAGEC)	(5) U/I
48	F	5320-00-865-8994	Rivet, Blind M24243/1-D404 (81349)	BX
49	O	8030-00-689-5646	Sealing compound 80065, (1PBQ8)	CN
50	O	8030-00-081-2337	Sealing Compound (087-21) (05972)	BX
51	O	8040-01-331-7131	Silicone Sealant, RTV MIL-A-46106 (81349)	CA
52	C		Sleeve, Repair[1, 2,] A601750, (0WFM3)	EA
53	F	3439-00-204-2546	Solder, Tin Alloy SN95/5 SB5WS 0.094 1LB (81346)	SL
54	C	6530-01-268-5480	Spray Bottle 83, (4M682)	EA
55	O	5975-00-727-5153	Strap Tie-Down, Electrical Components, 3 3/4 inch (92.25 mm), MS33671-4-9, (81343)	HD
56	O	5975-00-570-9598	Strap Tie-Down, Electrical Components, 11 1/2 inch (292.10 mm) MS3367-7-9, (81343)	HD
57	O	5975-00-156-3253	Strap Tie-Down, Electrical Components, 14 1/2 inch (368.30 mm), MS3367-2-9, (81343)	HD
58	O	8030-00-889-3535	Tape, Antisiezing AA58092-2-2, (58536)	EA
59	F		Wire, (18 AWG), Stranded 6808K21, (39428)	KT
60	F		Wire, (16 AWG), Stranded, Black 69835K361, (39428)	KT
			Wire, (16 AWG), Stranded, White 69835k461, (39428)	KT

EXPENDABLE AND DURABLE ITEMS LIST – Continued

Table 2. Shelter Repair Kit Items.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, Part Number/(CAGEC)	(5) U/I
1	C		Hack Saw[1, 2,] A601451, (0WFM3)	EA
2	C		Ratchet[1, 2] JS900680, (0WFM3)	EA
3	C		Scissors, 4 inch (101.6 mm) [1, 2] A601051, (0WFM3)	EA
4	C		Wrench, Spanner 3/16 inch (4.76 mm)[1, 2,] A601150, (0WFM3)	EA

NOTE

1. This item is part of Tent Component Kit MA100735 (WP 0166).
2. This item is part of Tent Component Kit MA100740 (WP 0166).

END OF WORK PACKAGE

Subject **WP Sequence No. – Page No.**

INDEX

A

Access Panels and Latches (Genset)
Access Panels Removal/Replacement ..... WP 0039-2
Access Panel Latch Removal/Replacement ..... WP 0039-10
Access Cover Removal/Replacement ..... WP 0039-12
Repair Parts ..... WP 0135
Actuator Brake
Removal/Replacement ..... WP 0128-7
Repair Parts ..... WP 0153
Additional Authorization List (AAL) ..... WP 0167
Additional Authorization List ..... WP 0167-1
Explanation of Columns in the AAL ..... WP 0167-1
Air Intake Filter
Removal/Replacement ..... WP 0043-2
Repair Parts ..... WP 0143
Air Filter (ECU)
Removal/Replacement ..... WP 0101-2
Repair Parts ..... WP 0135
Alternator
Removal/Replacement ..... WP 0060-2
Repair Parts ..... WP 0141
AUXILIARY Fuel Ports
Removal/Replacement ..... WP 0084-5
Repair Parts ..... WP 0139
AUX Heat switch
Removal/Replacement ..... WP 0103-6
Repair Parts ..... WP 0137

B

Barrier panel (Genset)
Removal/Replacement (individual components) ..... WP 0075 to WP 0083
Repair Parts (individual components) ..... WP 0148
Troubleshooting (individual components) ..... WP 0028
Battery (Genset)
Battery Fuse (Version 1) Removal/Replacement ..... WP 0041-2
Battery Fuse (Version 2 and 3) Removal/Replacement ..... WP 0041-5
Battery, Retainer and Bracket Removal/Replacement (Version 1) ..... WP 0041-8
Battery, Retainer and Bracket Removal/Replacement (Version 2) ..... WP 0041-13
Battery, Retainer and Bracket Removal/Replacement (Version 3) ..... WP 0041-19
Battery Warmer Removal/Replacement (Version 1) ..... WP 0041-25
Battery Warmer Removal/Replacement (Version 2 and 3)) ..... WP 0041-28
Charging ..... WP 0023-2
Repair Parts ..... WP 0140
Battery Charger (Genset)
Removal/Replacement ..... WP 0083-2
Repair Parts ..... WP 0148
Brake (hand) (Trailer)
Cable and sheath Removal/Replacement ..... WP 0128-14
Hand brake Removal/Replacement ..... WP 0128-11
Repair Parts ..... WP 0152
Brazing ..... WP 0110-5

Subject **WP Sequence No. – Page No.**

B – Continued

Brakes (Trailer)
- Actuator Removal/Replacement ..... WP 0128-7
- Adjustment ..... WP 0126-15
- Bleed Brake System ..... WP 0127-8
- Brake hub/drum Removal/Replacement ..... WP 0126-2
- Brake lines Removal/Replacement ..... WP 0127-4
- Brakeshoe Removal/Clean and Inspect/Replacement ..... WP 0126-9
- Backing Plate Removal/Replacement ..... WP 0126-13
- Master cylinder Removal/Replacement ..... WP 0127-2
- Repair Parts ..... WP 0152

Bridge rectifier
- Removal/Replacement ..... WP 0107-4
- Repair Parts ..... WP 0137

Bulbs (ECU)
- Removal/Replacement ..... WP 0103-2
- Repair Parts ..... WP 0137

Bulbs (Genset)
- Removal/Replacement ..... WP 0020-2
- Repair Parts ..... WP 0146

C

Cargo Net
- Removal/Replacement ..... WP 0121-5
- Repair Parts ..... WP 0149

Charging (ECU) ..... WP 0113-4

Circuit Breakers (ECU)
- Removal/Replacement ..... WP 0104-2
- Repair Parts ..... WP 0137

Circuit breaker (Genset)
- Removal/Replacement ..... WP 0082-2
- Repair Parts ..... WP 0148

Components of End Item (COEI) and Basic Issue Items (BII) Lists ..... WP 0166
- Basic Issue Items List ..... WP 0166-9
- Components of End Item List ..... WP 0166-2
- Explanation of Columns in the COEI List and BII List ..... WP 0166

Compressor (ECU)
- Removal/Replacement ..... WP 0099-2
- Repair Parts ..... WP 0135

Condenser Coil (ECU)
- Cleaning ..... WP 0092-4

Condenser Fan
- Removal/Replacement ..... WP 0097-2
- Repair Parts ..... WP 0138

Condenser Grill
- Removal/Replacement ..... WP 0092-2
- Repair Parts ..... WP 0135

Connectors (Genset J1 through J6)
- Removal/Replacement ..... WP 0074
- Repair Parts ..... WP 0147

Subject **WP Sequence No. – Page No.**

C - Continued

Control Panel (ECU)
- Circuit breaker removal/replacement ..... WP 0104
- Contactors removal/replacement ..... WP 0105
- Indicator lights removal/replacement ..... WP 0103
- Relays removal/replacement ..... WP 0106
- Repair Parts ..... WP 0137
- Starter protectors removal/replacement ..... WP 0108
- Switches removal/replacement ..... WP 0103, WP 0095
- Thermostat removal/replacement ..... WP 0103-8

Control Panel (Genset)
- Latches removal/replacement ..... WP 0040-2
- Gauges removal/replacement ..... WP 0069
- Lights removal/replacement ..... WP 0071
- Meters removal/replacement ..... WP 0068, WP 0069
- Switches removal/replacement ..... WP 0070, WP 0072
- Wiring harness removal/replacement ..... WP 0073
- Repair Parts ..... WP 0146

Coolant
- Removal/Replacement ..... WP 0058-2
- Replacement ..... WP 0022-4

Coolant Temperature Sensor
- Removal/Replacement ..... WP 0055-2
- Repair Parts ..... WP 0141

Coolant Temperature Switch
- Removal/Replacement ..... WP 0056-2
- Repair Parts ..... WP 0141

Crew Maintenance Instructions
- ECU ..... WP 0022
- Genset ..... WP 0020, WP 0021, WP 0023
- Shelter ..... WP 0024, WP 0025, WP 0026

Crew Preventive Maintenance Checks and Services (PMCS) Introduction ..... WP 0018

Crew Preventive Maintenance Checks and Services (PMCS) ..... WP 0019

Crew Troubleshooting
- ECU ..... WP 0013
- Genset (Electrical) ..... WP 0012
- Genset (Engine) ..... WP 0011
- Shelter (Electrical) ..... WP 0016
- Shelter (Mechanical) ..... WP 0015
- Trailer ..... WP 0014
- Troubleshooting Index ..... WP 0010

Current Transformer
- Removal/Replacement ..... WP 0075-2
- Repair Parts ..... WP 0148

Subject	WP Sequence No. – Page No.
D	
Damper Plate	
Removal/Replacement	WP 0093-8
Repair Parts	WP 0136
Description and Use of Controls, Indicators, and Connectors	WP 0004
Destruction of Equipment to Prevent Enemy Use	WP 0001-2 WP 0161 WP 0162
Diesel Speed Sensor	
Inspect	WP 0054-3
Removal/Replacement	WP 0054-2
Repair Parts	WP 0141
Duct Cover	
Removal/Replacement	WP 0093-2
Repair Parts	WP 0136
E	
ECU	
Brazing	WP 0110-5
Description and Use of Operator Controls, Indicators, and Connectors	WP 0004-7
ECU Start Procedure	WP 0005-26
ECU Shut Down Procedure	WP 0005-28
Equipment Data	WP 0002-9
Equipment Description	WP 0002-5
Crew Level Maintenance	WP 0022
Crew Level Troubleshooting	WP 0013
Maintainer Level Maintenance	WP 0091 to WP 0114
Maintainer Level Troubleshooting	
Operating ECU as a Stand-Alone Unit	WP 0006-5
Purging	WP 0110-3
Refrigerant System Charging	WP 0113-4
Refrigerant System Recovery	WP 0113-2
Removal/Replacement	WP 0109-2
Repair Parts	WP 0134 to WP 0138
Vacuuming	WP 0112
Electric Fuel Pump	
Removal/Replacement	WP 0047-2
Repair Parts	WP 0141
Engine Coolant	
Check level/add	WP 0021-4
Removal/Replacement	WP 0058-2
Engine Coolant Reservoir Bottle	
Removal/Replacement	WP 0058-5
Repair Parts	WP 0144
Engine Heater (Hydronic)	
Fuel Filter Removal/Replacement	WP 0064-6
Fuel Pump Removal/Replacement	WP 0064-6
Fuse Removal/Replacement	WP 0064-19
Crew Level Troubleshooting	WP 0011
Removal/Replacement	WP 0064-2
Repair Parts	WP 0139
Maintainer Level Troubleshooting	WP 0029-28

Subject **WP Sequence No. – Page No.**

E - Continued

Equipment Characteristics, Capabilities, and Features ..... WP 0002-1
Equipment Data ..... WP 0002-8
Evaporator Fan
Removal/Replacement ..... WP 0096-2
Repair Parts ..... WP 0138
Exhaust Flex Pipe, Elbow and Muffler
Removal/Replacement ..... WP 0065-2
Repair Parts ..... WP 0145
Exhaust Manifold and gasket
Removal/Replacement ..... WP 0066-2
Repair Parts ..... WP 0145
Expendable and Durable Items List ..... WP 0168
Expendable and Durable Items List Table ..... WP 0168-1
Explanation of Columns in the Expendable/Durable Items List ..... WP 0168-1
Introduction ..... WP 0168-1
Scope ..... WP 0168-1

F

Fan (Genset)
Removal/Replacement ..... WP 0062-2
Repair Parts ..... WP 0142
Fan Belt- (ECU)
Adjustment ..... WP 0098-2
Removal/Replacement ..... WP 0098-4
Repair Parts ..... WP 0138
Fan Belt (Genset)
Adjustment ..... WP 0061-2
Inspect ..... WP 0061-2
Removal/Replacement ..... WP 0061-3
Repair Parts ..... WP 0142
Field Repair Kit (Tent Component Kit) ..... WP 0154, WP 0168
Filter- Air Intake
Removal/Replacement ..... WP 0043-2
Repair Parts ..... WP 0143
Filter/Dryer
Removal/Replacement ..... WP 0102-2
Repair Parts ..... WP 0135
Filter-ECU
Cleaning ..... WP 0101-2
Repair Parts ..... WP 0135
Filter, Fuel Diesel Engine
Removal/Replacement ..... WP 0044-2
Repair Parts ..... WP 0141
Filter, Fuel – Engine Heater (Hydronic)
Removal/Replacement ..... WP 0064-6
Repair Parts ..... WP 0139
Filter, Fuel – Hydronic Heater (ECU)
Removal/Replacement ..... WP 0094-5
Repair Parts ..... WP 0135
Filter, Oil - Diesel Engine
Removal/Replacement ..... WP 0042-2
Repair Parts ..... WP 0141

Subject **WP Sequence No. – Page No.**

F - Continued

Fire Extinguisher bracket
Removal/Replacement ..... WP 0122-8
Repair Parts ..... WP 0139
Fold-outs
Genset Connectors (Sh 1 of 2) FP-31/32
Genset Connectors (Sh 2 of 2) FP-33/34
Genset Power Distribution Panel – New Version (with EMI) FP-41-42
Genset Power Distribution Panel – New Version (without EMI) FP-43-44
Schematic – ECU (V1) FP-1/2
Schematic – ECU (V2) FP-5/6
Schematic – ECU Refrigerant FP-9/10
Schematic – Genset Barrier Panel (Sh 1 of 5) FP-15/16
Schematic – Genset Barrier Panel (Sh 2 of 5) FP-17/18
Schematic – Genset Barrier Panel (Sh 3 of 5) FP-19/20
Schematic – Genset Barrier Panel (Sh 4 of 5) FP-21/22
Schematic – Genset Barrier Panel (Sh 5 of 5) FP-23/24
Schematic – Genset Control Panel FP-11/12
Schematic – Genset Power Distribution Panel FP-13/14
Schematic – Genset Wiring Harness FP-25/26
Schematic – Hydronic Heater FP-35/36
Wire List – Genset (Sh 1 of 2) FP-27/28
Wire List – Genset (Sh 2 of 2) FP-29/30
Wiring Diagram – Inter-vehicular cable (LED) FP-37/38
Wiring Diagram – Inter-vehicular cable (Incandescent) FP-39/40
Fuel Injection System
Fuel Injector Removal/Clean/Replacement ..... WP 0048-2
Fuel Injector Pump Removal/Replacement ..... WP 0048-6
Fuel Injection System Lines Removal/Replacement ..... WP 0048-10
Prime Fuel System ..... WP 0048-16
Repair Parts ..... WP 0141
Fuel Gauge
Removal/Inspect/Replacement ..... WP 0085-2
Repair Parts ..... WP 0141
Fuel Hose
Removal/Replacement ..... WP 0085-10
Repair Parts ..... WP 0141
Fuel Line heater
Removal/Replacement ..... WP 0085-12
Repair Parts ..... WP 0139
Fuel Pump, Engine Heater (Hydronic)
Removal/Replacement ..... WP 0064-6
Repair Parts ..... WP 0139
Fuel Pump, Hydronic Heater (ECU)
Removal/Replacement ..... WP 0094-5
Repair Parts ..... WP 0135
Fuel Pump, Electric (Genset)
Removal/Replacement ..... WP 0047-2
Repair Parts ..... WP 0141
Fuel Selector switch
Removal/Replacement ..... WP 0084-2
Repair Parts ..... WP 0139
Fuel Tank
Removal/Replacement ..... WP 0085-5
Repair Parts ..... WP 0139
Service ..... WP 0045-2

Subject	WP Sequence No. – Page No.
F – Continued	
Fuse (Battery)	
Removal/Replacement	WP 0041-2
Repair Parts	WP 0140
Fuse (Genset)	
Removal/Replacement	WP 0040-4
Repair Parts	WP 0148-5
Test	WP 0040-4
Fuse (Hydronic heaters)	
Removal/Replacement	WP 0094-12, WP 0064-19
Repair Parts	WP 0139, WP 0135
Fuse (Light Fixture)	
Removal/Replacement	WP 0130-4
Repair Parts	WP 0157
G	
Gauges	
COOLANT TEMP Test	WP 0069-4
OIL PRESSURE Test	WP 0069-3
Repair Parts	WP 0146
Removal/Replacement	WP 0069-4
Troubleshooting	WP 0028
General Information	
Corrosion Prevention and Control (CPC)	WP 0001-2
Destruction of Army Material to Prevent Enemy Use	WP 0001-2
List of Abbreviations/Acronyms	WP 0001-4
Maintenance Forms, Records, and Reports	WP 0001-2
Nomenclature Cross - Reference List	WP 0001-3
Nuclear Hardness	WP 0001-6
Ozone Depleting Substances (ODS)	WP 0001-2
Parts Information for Repair Parts, Special Tools, TMDE and Support Equipment	WP 0001-6
Preparation for Storage or Shipment	WP 0001-3
Quality of Material	WP 0001-5
Reporting Equipment Improvement Recommendations (EIR)	WP 0001-2
Safety, Care, and Handling	WP 0001-6
Scope	WP 0001-1
Warranty Information	WP 0001-3
Genset	
Crew Level Maintenance Procedures	WP 0020, WP 0021
Crew Level Troubleshooting	WP 0011, WP 0012
Description and Use of Operator Controls, Indicators, and Connectors	WP 0004-1
Engine Generator Assembly - Removal and Replacement	WP 0086-7
Equipment Data	WP 0002-9
Equipment Description	WP 0002-2
Generator Fueling	WP 0005-23
Genset Start Procedure	WP 0005-25
Genset Shut Down Procedure	WP 0005-28
Maintainer Level Maintenance	WP 0039 to WP 0086
Maintainer Level Troubleshooting	WP 0028, WP 0029

Subject	WP Sequence No. – Page No.
G - Continued	
Removal/Replacement including Enclosure	WP 0086-2
Repair Parts	WP 0139 to WP 0148
Separating Engine Generator Assembly – Removal and Replacement	WP 0086-26
Glow Plug and Glow Plug Connector	
Inspect	WP 0049-3
Removal/Replacement	WP 0049-2
Repair Parts	WP 0141
Test	WP 0049-3
Governor	
Adjustments	WP 0081-5
Removal/Replacement	WP 0081-2
Repair Parts	WP 0148
Ground stud (trailer)	
Removal/Replacement	WP 0122-4
Repair Parts	WP 0149
H	
Hub (Shelter)	
Removal/Replacement	WP 0026-4
Repair Parts	WP 0154, WP 0155
Hydronic Heater (ECU)	
Crew Level Troubleshooting	WP 0013
Fuel Filter Removal/Replacement	WP 0094-5
Fuel Pump and Fuel Filter Removal/replacement	WP 0094-5
Fuse Removal/Replacement	WP 0094-12
Hoses Removal/Replacement	WP 0094-9
Maintainer Level Troubleshooting	WP 0030
Removal/Replacement	WP 0094-2
Repair Parts	WP 0135
I	
Inter-Vehicular Cable	
Removal/Replacement	WP 0125
Repair Parts	WP 0149
Testing	WP 0023-5
J	
Jack, Tongue	
Removal/Replacement	WP 0119-4
Repair Parts	WP 0149

Subject	WP Sequence No. – Page No.
K	
Keeper (Shelter)	
Removal/Replacement	WP 0026-2
Repair Parts	WP 0154, WP 0155
L	
Lamp, Fluorescent (Shelter)	
Removal/Replacement	WP 0130-2
Repair Parts	WP 0157
Lanyard (Trailer)	
Removal/Replacement	WP 0122-6
Repair Parts	WP 0149
Leak check (ECU)	WP 0111
Level (Trailer)	
Removal/Replacement	WP 0119-2
Repair Parts	WP 0149
Lights (ECU control panel)	
Removal/Replacement	WP 0103-2
Repair Parts	WP 0137
Lights (Genset Control panel)	
Removal/Replacement	WP 0071-2
Repair Parts	WP 0146
Lights (Genset power distribution panel)	
Removal/Replacement	WP 0074-2
Repair Parts	WP 0147
Lighting (Shelter)	
Install Shelter Lighting	WP 0005-21
Repair Parts	WP 0157
Lunette	
Removal/Replacement	WP 0128-2
Repair Parts	WP 0153
M	
Manifold, Exhaust (Genset)	
Removal/Replacement	WP 0066-2
Repair Parts	WP 0145
Master Cylinder Service	
Fluid Replacement	WP 0021-6
Removal/Replacement	WP 0127-2
Repair Parts	WP 0152
Maintainer Maintenance Instructions	
ECU	WP 0091 to WP 0114
Genset	WP 0039 to WP 0086
Shelter and Trailer	WP 0119 to WP 0130
Maintainer Troubleshooting	
ECU (Electrical)/Hydronic Heater	WP 0030
ECU (Heating & Cooling)/Hydronic Heater	WP 0031

Subject **WP Sequence No. – Page No.**

M – Continued

Maintainer Troubleshooting – Continued
- Genset (Electrical) ..... WP 0028
- Genset (Engine) ..... WP 0029
- Shelter (Electrical) ..... WP 0034
- Trailer (Electrical) ..... WP 0032
- Trailer (Mechanical) ..... WP 0033
- Troubleshooting Index ..... WP 0027

Maintenance Allocation Chart (MAC) ..... WP 0165
Maintenance Allocation Chart (MAC) Introduction ..... WP 0164
- Explanation of Columns in Remarks ..... WP 0164-4
- Explanation of Columns in the MAC ..... WP 0164-3
- Explanation of Columns in Tools and Test Equipment Requirements ..... WP 0164-3
- Maintenance Functions ..... WP 0164-1
- The Army Maintenance System MAC ..... WP 0164-1

Meters
- A-C AMPMETERS Removal/Replacement ..... WP 0068-2
- A-C KILOWATTS meter Removal/Replacement ..... WP 0068-2
- A-C- VOLTS meter Removal/Replacement ..... WP 0068-2
- Adjustment (Genset meters) ..... WP 0068-2
- BATTERY CHARGER AMPS meter Removal/Replacement ..... WP 0069-3
- DC VOLTS meter Removal/Replacement ..... WP 0069-4
- HERTZ meter Removal/Replacement ..... WP 0068-2
- HOUR meter (ECU) Removal/Replacement ..... WP 0103-3
- HOURMETER (Genset) Removal/Replacement ..... WP 0069-7
- Repair Parts ..... WP 0146
- Troubleshooting ..... WP 0028

Motor, Condenser Fan (ECU)
- Removal/Replacement ..... WP 0097-2
- Repair Parts ..... WP 0138

Motor, Evaporator Fan (ECU)
- Removal/Replacement ..... WP 0096-2
- Repair Parts ..... WP 0138

Muffler (Genset)
- Removal/Replacement ..... WP 0065-6
- Repair Parts ..... WP 0145

N

National Stock Number Index ..... WP 0159

O

Oil (Genset)
- Add ..... WP 0021-2
- Removal/Replacement ..... WP 0042-2

Oil Filter (Genset)
- Removal/Replacement ..... WP 0042-2
- Repair Part ..... WP 0141

Oil Pressure Switch (Genset)
- Removal/Replacement ..... WP 0050-2
- Repair Parts ..... WP 0141

Oil Pressure Sending Unit (Genset)
- Removal/Replacement ..... WP 0051-2
- Repair Parts ..... WP 0141

On-Vehicle Equipment Loading Plan ..... WP 0009

Subject	WP Sequence No. – Page No.
O –Continued	
Operation Under Unusual Conditions	
General	WP 0006-1
Interim Nuclear, Biological, and Chemical (NBC) Decontamination Procedures	WP 0006-7
Jamming and Electronic Countermeasures (ECM) Procedure	WP 0006-11
Unusual Environment/Weather	WP 0006-1
Operating ECU as a Stand-Alone Unit	WP 0006-5
Security Measures for Electronic Data	WP 0006-1
Operation Under Usual Conditions	WP 0005
Assembly and Preparation for Use	WP 0005-2
Connecting Cables and Equipment	WP 0005-20
Disconnecting Cables and Equipment	WP 0005-29
General	WP 0005-1
Generator Fueling	WP 0005-23
Preparation for Movement	WP 0005-36
Preparing Shelter Site	WP 0005-2
Security Measurements for Electronic Data	WP 0005-1
Shelter Setup	WP 0005-7
Shelter Tear Down	WP 0005-30
Site Requirements	WP 0005-1
System Packing and Loading	WP 0005-33
System Power-Down	WP 0005-28
System Power-Up Procedures	WP 0005-25
Trailer Setup	WP 0005-3
Weight and Center of Gravity	WP 0005-45
P	
Part Number Index	WP 0160
PDU (ECU)	
Crew Level Troubleshooting	WP 0016
Description and Use of Operator Controls, Indicators, and Connectors	WP 0004-9
Equipment Data	WP 0002-10
Equipment Description	WP 0002-6
Maintainer Level Troubleshooting	WP 0034
Potentiometer, Voltage Adjust (Genset)	
Removal/Replacement	WP 0070-2
Repair Part	WP 0146
Power cable (ECU)	
Repair Part	WP 0133
Power Down Procedures	WP 0005-28
Preparation for Movement	WP 0005-36
Preparation for Shipping	WP 0005-43
Q	
Quench Valve (ECU)	
Removal/Replacement	WP 0100-7
Repair Parts	WP 0135

Subject **WP Sequence No. – Page No.**

R

Radiator (Genset)
Removal/Replacement ..... WP 0059-4
Repair Parts ..... WP 0144
Radiator Coolant (Genset)
Add ..... WP 0021-4
Removal/Replacement ..... WP 0058-2
Radiator Hoses
Removal/Replacement ..... WP 0059-2
Repair Parts ..... WP 0144
References
Field Manuals ..... WP 0163-1
Government Publications ..... WP 0163-1
Scope ..... WP 0163-1
Technical Bulletins ..... WP 0163-2
Technical Manuals ..... WP 0163-2
Reflector (Trailer)
Removal/Replacement ..... WP 0122-2
Repair Parts ..... WP 0149
Relays (ECU)
Phase Sensing Removal/Replacement ..... WP 0106-2
Time Delay Removal/Replacement ..... WP 0106-2
Repair Part ..... WP 0137
Relays (Genset)
Engine over speed (K5) Removal/Replacement ..... WP 0077-2
Governor control (K7) Removal/Replacement ..... WP 0077-2
Oil pressure Low cut-off (K6) Removal/Replacement ..... WP 0077-2
Over temperature (K4) Removal/Replacement ..... WP 0077-2
Repair Part ..... WP 0148
Repair Parts and Special Tools List Introduction
Abbreviations ..... WP 0131-6
Explanation of Columns in the Repair Parts and Special Tools Work Packages ..... WP 0131-1
Explanation of Cross-Reference Indexes Work Packages Format and Columns ..... WP 0131-5
General ..... WP 0131-1
How To Locate Repair Parts ..... WP 0131-6
Scope ..... WP 0131-1
Repair Parts List, Power Plant, Utility, A1-38283D-001/A1-38283D-002 ..... WP 0132
Repair Parts List, Tent, Modular, General Purpose System, TMSS100G/TMSS100T ..... WP 0133
Repair Parts List, Air Conditioner, T256250G/T256250T ..... WP 0134
Repair Parts List, Air Conditioner Enclosure, T250250G/T250250T ..... WP 0135
Repair Parts List, Panel, Evaporator Assembly, TG423-0451-1G/TG423-0451-1T ..... WP 0136
Repair Parts List, Control, Enclosure, Air Conditioner, 088T103 ..... WP 0137
Repair Parts List, Blower Assembly, 054T102 ..... WP 0138
Repair Parts List, Generator, Diesel Engine, T282271G/T282271T ..... WP 0139
Repair Parts List, Battery Assembly, T235064 ..... WP 0140
Repair Parts List, Engine Assembly, T245264 ..... WP 0141
Repair Parts List, Cooling System, Installation, TG440-0001 ..... WP 0142
Repair Parts List, Air Intake Assembly, X-14210-057-0 ..... WP 0143
Repair Parts List, Radiator Assembly, TG421-9000 ..... WP 0144
Repair Parts List, Exhaust Assembly, T235005 ..... WP 0145
Repair Parts List, Control Panel, T225453 ..... WP 0146
Repair Parts List, Power Distribution Panel, TG421-9007 ..... WP 0147
Repair Parts List, Barrier Panel T225250-5 ..... WP 0148

Subject **WP Sequence No. – Page No.**

R – Continued

Repair Parts List, Chassis, Trailer Assembly, T215125G/T215125T ..... WP 0149
Repair Parts List, Stop Light, Vehicular, 12375837-BK-SP ..... WP 0150
Repair Parts List, Tongue Jack Assembly, PCHA0175G/PCHA0175T ..... WP 0151
Repair Parts List, Brake, TG421-9006G/T6421-9006G/T6421-9006T ..... WP 0152
Repair Parts List, Actuator Assembly, TG404-0819G/TG404-D819T ..... WP 0153
Repair Parts List, Tent, MXA2000G/MXA2000T ..... WP 0154
Repair Parts List, Tent, End Cap, MXA2020G/MXA2020T ..... WP 0155
Repair Parts List, Tent, Roof and Sides, MXA2035G/ MXA2035T ..... WP 0156
Repair Parts List, Power Distribution Service, Tent, T2-930001 (No Parts Authorized)
Repair Parts List, Light Set, Tent, H300070 ..... WP 0157
Repair Parts List, Wiring Kit, Electrical, T2-95205 ..... WP 0158
Repair Parts List, Stock Number Index ..... WP 0159
Repair Parts List, Part Number Index ..... WP 0160

S

Safety Chain (Trailer)
- Removal/Replacement ..... WP 0119-3
- Repair Parts ..... WP 0149

Schematics ..... FP-1 to FP-44

Shelter
- Equipment Data ..... WP 0002-8
- Equipment Description ..... WP 0002-2
- Crew Level Maintenance Procedures ..... WP 0024 to WP 0026
- Crew Level Troubleshooting ..... WP 0015, WP 0016
- Maintainer Level Maintenance Procedures ..... WP 0130
- Maintainer Level Troubleshooting ..... WP 0034
- Repair Parts ..... WP 0154 to WP 0157

Shelter Cover/End Cap
- Removal/Replacement ..... WP 0024-4
- Repair ..... WP 0024-2
- Repair Parts ..... WP 0154

Shelter Main Hub
- Removal/Replacement ..... WP 0026-4
- Repair Parts ..... WP 0154

Shelter Main Staking Bracket
- Removal/Replacement ..... WP 0026-6
- Repair Parts ..... WP 0154

Shelter Strut Removal/Replacement
- Removal/Replacement ..... WP 0025-4
- Repair ..... WP 0025-2
- Repair Parts ..... WP 0154

Sliding Door
- Removal/Replacement ..... WP 0093-4
- Repair Parts ..... WP 0136

Subject **WP Sequence No. – Page No.**

S – Continued

Solenoid Valve (ECU)
Removal/Replacement ..... WP 0100-17
Repair Parts ..... WP 0137
Solenoid (Genset)
Removal/Replacement ..... WP 0052-2
Repair Parts ..... WP 0141
Speed sensor (Genset)
Removal/Replacement ..... WP 0054-2
Repair Parts ..... WP 0141
Stabilizer Leg (Trailer)
Removal/Replacement ..... WP 0121-2
Repair Parts ..... WP 0149
Starter
Removal/Replacement ..... WP 0053-2
Repair Parts ..... WP 0141
Stowage and Decal/Data Plate Guide ..... WP 0008
Superheat Adjustment, Thermal Expansion Valve (ECU) ..... WP 0100-5
Sub-cool setting adjustment, ECU ..... WP 0114-2
Switches (ECU)
High pressure-cut off Removal/Replacement ..... WP 0095-4
High-temp cut off Removal/Replacement ..... WP 0095-2
Low pressure cut-off Removal/Replacement ..... WP 0095-7
MODE SELECT Removal/Replacement ..... WP 0103-4
Switches (Genset)
BATTERY SWITCH Removal/Replacement ..... WP 0072-2
BATTLE SHORT Removal/Replacement ..... WP 0070-10
EMERGENCY STOP Removal/Replacement ..... WP 0072-5
ENGINE Removal/Replacement ..... WP 0070-5
ENGINE HEATER Removal/Replacement ..... WP 0070-9
FUEL LINE HEATER Removal/Replacement ..... WP 0070-9
PANEL LIGHTS Removal/Replacement ..... WP 0070-5
VOLT/AMP Removal/Replacement ..... WP 0070-5

T

Temperature Sensor, Coolant (Genset)
Removal/Replacement ..... WP 0055-2
Repair Parts ..... WP 0141
Thermal Expansion Valve (ECU)
Adjustment ..... WP 0100-5
Removal/Replacement ..... WP 0100-2
Repair Parts ..... WP 0137
Thermostat (Genset)
Removal/Replacement ..... WP 0057-2
Repair Parts ..... WP 0142
Time delay (Genset)
Removal/Replacement ..... WP 0078-2
Repair Parts ..... WP 0148
Time delay (ECU)
Removal/Replacement ..... WP 0078-2
Repair Parts ..... WP 0137
Tire and Wheel Assembly (Trailer)
Removal/Replacement ..... WP 0129-2
Repair Parts ..... WP 0152

Subject	WP Sequence No. – Page No.
T - Continued	
Tongue Jack	
Removal/Replacement	WP 0119-4
Repair Parts	WP 0149
Torque Requirements	WP 0067
Towing Instructions	WP 0005-37
Trailer	
Crew Level Troubleshooting	WP 0014
Equipment Data	WP 0002-8
Equipment Description	WP 0002-3
Maintainer Level Maintenance Procedures	WP 0119 to WP 0129
Maintainer Level Troubleshooting Procedures	WP 0032, WP 0033
Repair Parts	WP 0149 to WP 0153
Transducer (Genset Barrier Panel)	
Removal/Replacement	WP 0076-2
Repair Parts	WP 0148
Transformer	
Removal/Replacement	WP 0107-2
Repair Parts	WP 0148
Troubleshooting	
Crew	
ECU	WP 0013
Genset (Electrical)	WP 0012
Genset (Engine)	WP 0011
Shelter (Electrical)	WP 0016
Shelter (Mechanical)	WP 0015
Trailer	WP 0014
Troubleshooting Index	WP 0010
Maintainer	
ECU (Electrical)	WP 0030
ECU (Heating & Cooling)	WP 0031
Genset (Electrical)	WP 0028
Genset (Engine)	WP 0029
Shelter (Electrical)	WP 0034
Trailer (Electrical)	WP 0032
Trailer (Mechanical)	WP 0033
Troubleshooting Index	WP 0027
V	
Valves (ECU)	
High Pressure Relief Valve Removal/Replacement	WP 0100-14
Hot Gas Bypass Valve Removal/Replacement	WP 0100-10
Quench Valve Removal/Replacement	WP 0100-7

Subject **WP Sequence No. – Page No.**

V - Continued

Valves (ECU) – Continued
Repair Parts ..... WP 0135
Solenoid Valve Removal/Replacement ..... WP 0100-17
Thermal Expansion Valve Removal/Replacement ..... WP 0100-2
Vehicle Stop Light Assembly (Incandescent) (Trailer)
Removal/Replacement ..... WP 0124-4
Repair Parts ..... WP 0149
Test ..... WP 0124-4
Vehicle Stop Light Assembly (LED) (Trailer)
Removal/Replacement ..... WP 0124-6
Repair Parts ..... WP 0149
Test ..... WP 0124-7
Vehicle Stop Light Bulb (Incandescent) (Trailer)
Removal/Replacement ..... WP 0124-2
Repair Parts ..... WP 0149
Test ..... WP 0124-2
Vehicle Stop Light Wiring Harness (Inter-Vehicular Cable) (Trailer)
Removal/Replacement ..... WP 0125-2
Repair Parts ..... WP 0149
Test ..... WP 0125-4
Voltage Regulator (Genset Barrier Panel)
Adjustment ..... WP 0079-5
Removal/Replacement ..... WP 0079-2
Repair Parts ..... WP 0148
V/HZ Roll-Off Frequency Selection ..... WP 0079-6

W

Water Pump (Genset)
Removal/Replacement ..... WP 0063-2
Repair Parts ..... WP 0142
Weight and Center of Gravity ..... WP 0005-45
Wheel
Removal/Replacement ..... WP 0129-2
Repair Parts ..... WP 0152
Wheel Cylinder
Removal/Replacement ..... WP 0126-6
Repair Parts ..... WP 0152
Wire harness (Genset)
Removal/Replacement ..... WP 0073-2
Repair Parts ..... WP 0149

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30, the proponent agency is OAASA	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE 30 Aug 2007
TO: *(Forward to proponent of publication or form) (Include ZIP Code)* Commander, US Army CECOM LCMC ATTN: AMSEL-LC-LEO-E-ED Fort Monmouth, NJ 07703-5006	**FROM:** *(Activity and location) (Include ZIP Code)* Jane Q. Doe, SFC 1234 Any Street Anytown, AL 34565	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 11-6115-742-13&P	16 Sep 2001	Operator and Field Maintenance Manual for Power Plant Utility PU-821/T and PU-822A/T

ITEM	PAGE	PARA-GRAPH	LINE	FIGURE	TABLE	RECOMMENDED CHANGES AND REASON
1	WP0005 PG3		2			Test or Corrective Action column should identify a different WP number.

EXAMPLE

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Jane Q. Doe, SFC	123-4567	

TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	**FROM:** *(Activity and location) (Include ZIP Code)*	**DATE**

PART II- REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 11-6115-742-13&P		Operator and Field Maintenance Manual for Power Plant Utility PU-821/T and PU-822A/T

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III - REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

EXAMPLE

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30, the proponent agency is OAASA	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
TO: *(Forward to proponent of publication or form) (Include ZIP Code)* Commander, US Army CECOM LCMC ATTN: AMSEL-LC-LEO-E-ED Fort Monmouth, NJ 07703-5006	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 11-6115-742-13&P		Operator and Field Maintenance Manual for Power Plant Utility PU-821/T and PU-822A/T

ITEM	PAGE	PARA-GRAPH	LINE	FIGURE	TABLE	RECOMMENDED CHANGES AND REASON

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TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	**FROM:** *(Activity and location) (Include ZIP Code)*	**DATE**
Commander, US Army CECOM LCMC ATTN: AMSEL-LC-LEO-E-ED Fort Monmouth, NJ 07703-5006		

PART II- REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 11-6115-742-13&P		Operator and Field Maintenance Manual for Power Plant Utility PU-821/T and PU-822A/T

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TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

By Order of the Secretary of the Army:

GEORGE W. CASEY, JR
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
0000000

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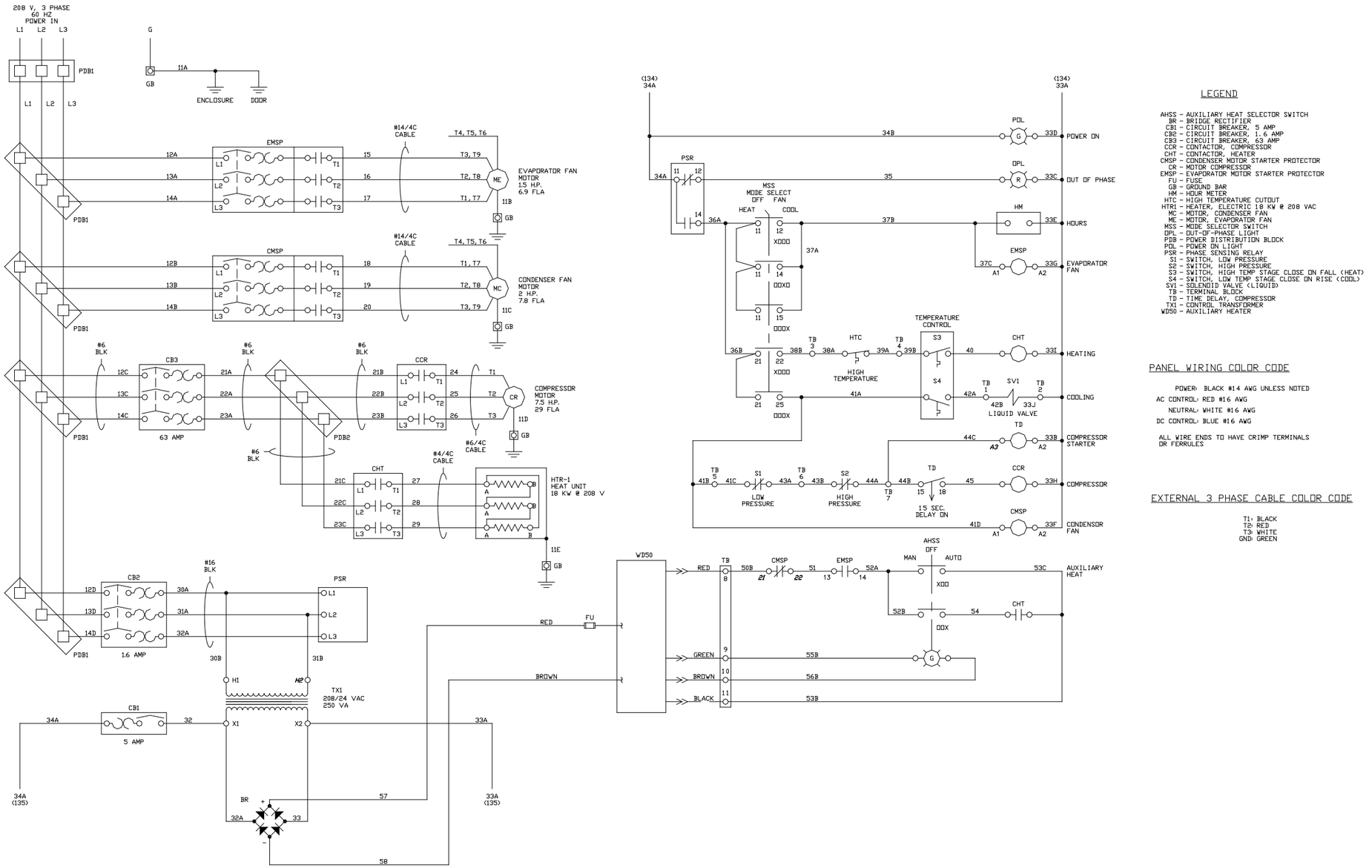

LEGEND

AHSS - AUXILIARY HEAT SELECTOR SWITCH
BR - BRIDGE RECTIFIER
CB1 - CIRCUIT BREAKER, 5 AMP
CB2 - CIRCUIT BREAKER, 1.6 AMP
CB3 - CIRCUIT BREAKER, 63 AMP
CCR - CONTACTOR, COMPRESSOR
CHT - CONTACTOR, HEATER
CMSP - CONDENSER MOTOR STARTER PROTECTOR
CR - MOTOR COMPRESSOR
EMSP - EVAPORATOR MOTOR STARTER PROTECTOR
FU - FUSE
GB - GROUND BAR
HM - HOUR METER
HTC - HIGH TEMPERATURE CUTOUT
HTR1 - HEATER, ELECTRIC 18 KW @ 208 VAC
MC - MOTOR, CONDENSER FAN
ME - MOTOR, EVAPORATOR FAN
MSS - MODE SELECTOR SWITCH
DPL - OUT-OF-PHASE LIGHT
PDB - POWER DISTRIBUTION BLOCK
PDL - POWER ON LIGHT
PSR - PHASE SENSING RELAY
S1 - SWITCH, LOW PRESSURE
S2 - SWITCH, HIGH PRESSURE
S3 - SWITCH, HIGH TEMP STAGE CLOSE ON FALL (HEAT)
S4 - SWITCH, LOW TEMP STAGE CLOSE ON RISE (COOL)
SV1 - SOLENOID VALVE (LIQUID)
TB - TERMINAL BLOCK
TD - TIME DELAY, COMPRESSOR
TX1 - CONTROL TRANSFORMER
WD50 - AUXILIARY HEATER

PANEL WIRING COLOR CODE

POWER: BLACK #14 AWG UNLESS NOTED
AC CONTROL: RED #16 AWG
NEUTRAL: WHITE #16 AWG
DC CONTROL: BLUE #16 AWG

ALL WIRE ENDS TO HAVE CRIMP TERMINALS OR FERRULES

EXTERNAL 3 PHASE CABLE COLOR CODE

T1: BLACK
T2: RED
T3: WHITE
GND: GREEN

Figure FO-1. Schematic ECU (V1)

FP-1/FP-2 blank

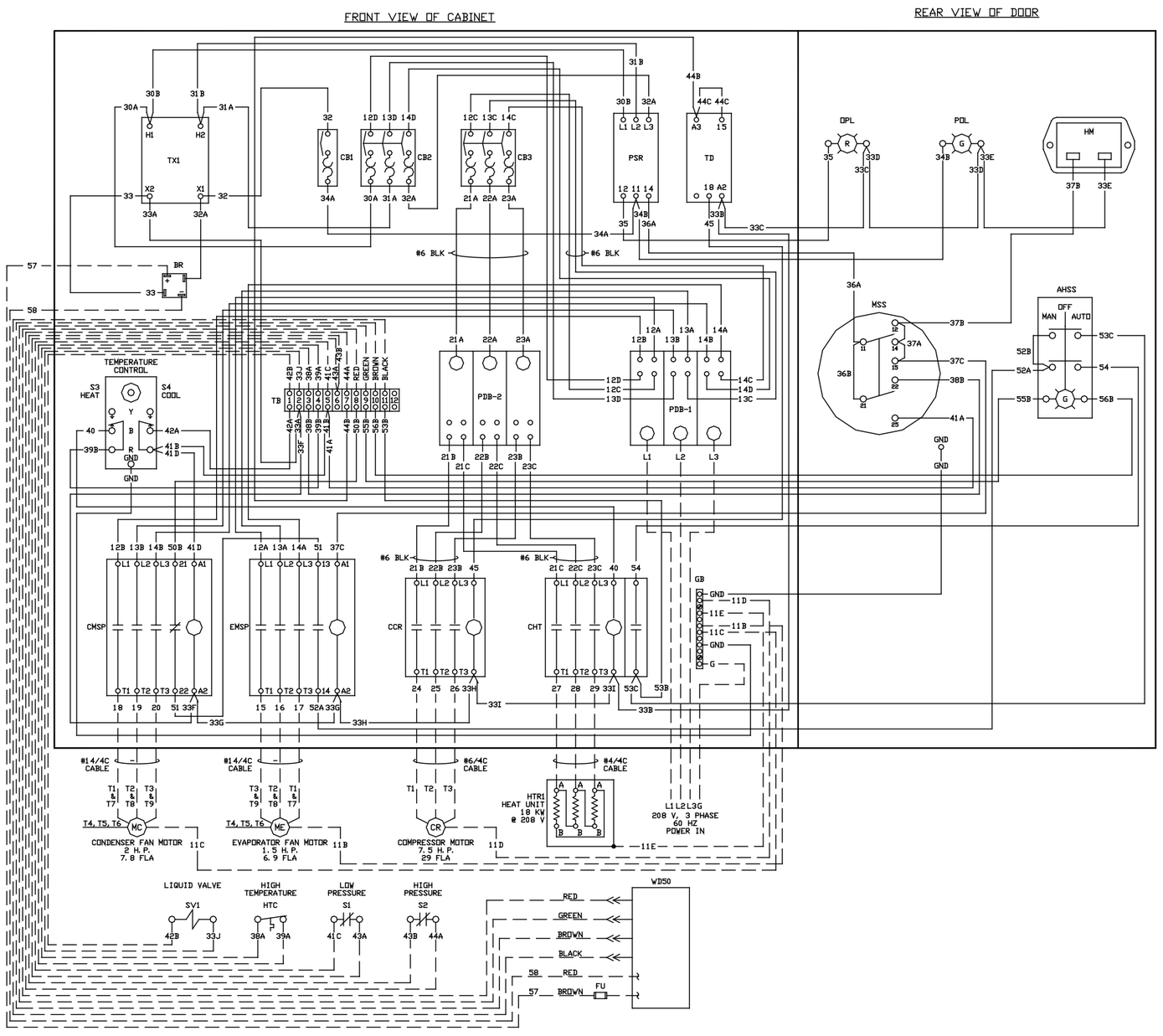

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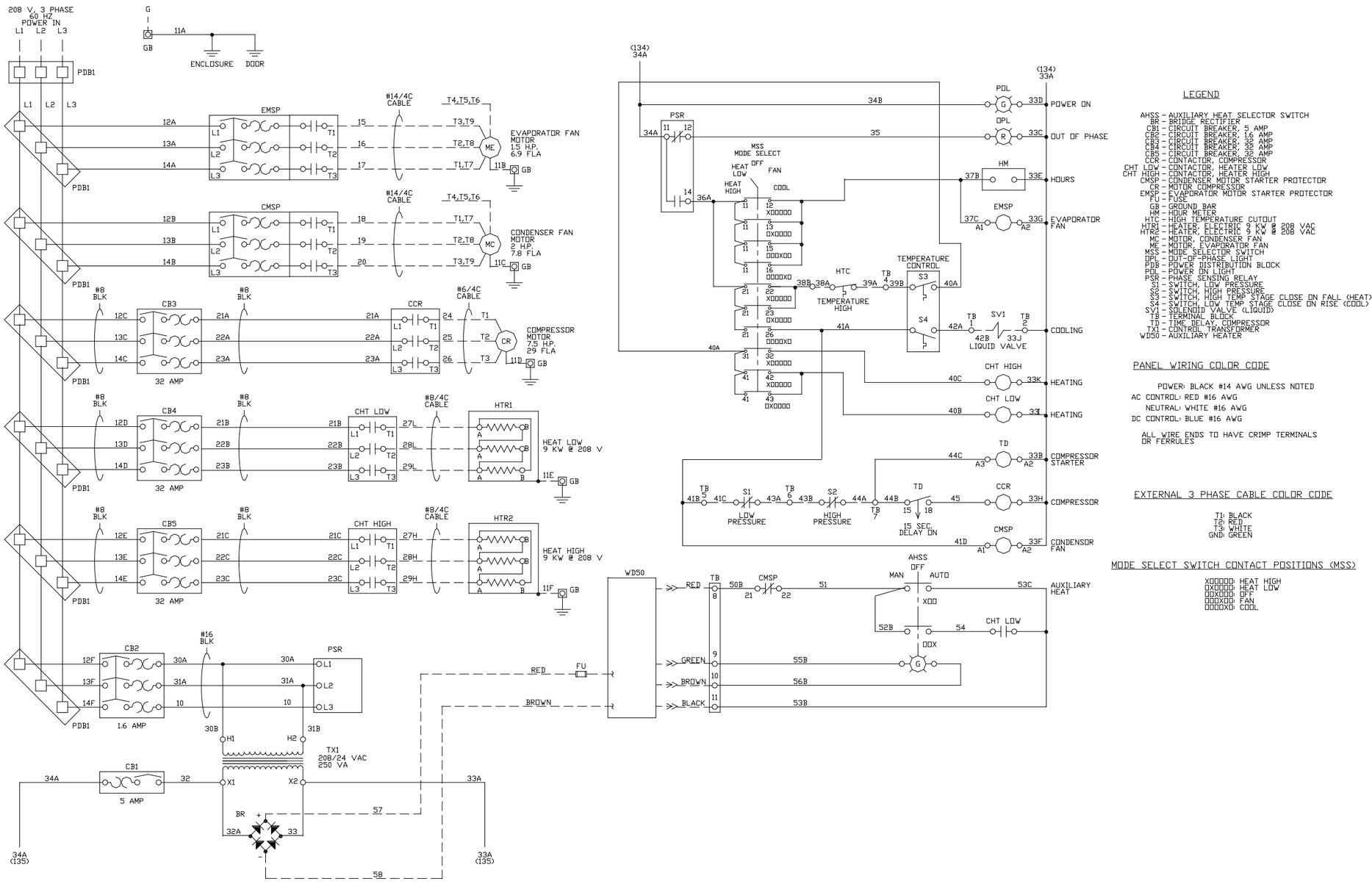
Figure FO-2. Wiring Diagram ECU (V1)

FP-3/FP-4 blank



LEGEND

AHSS – AUXILIARY HEAT SELECTOR SWITCH
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CB1 – CIRCUIT BREAKER, 5 AMP
CB2 – CIRCUIT BREAKER, 1.6 AMP
CB3 – CIRCUIT BREAKER, 32 AMP
CB4 – CIRCUIT BREAKER, 32 AMP
CB5 – CIRCUIT BREAKER, 32 AMP
CCR – CONTACTOR, COMPRESSOR
CHT LOW – CONTACTOR, HEATER LOW
CHT HIGH – CONTACTOR, HEATER HIGH
CMSP – CONDENSER MOTOR STARTER PROTECTOR
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EMSP – EVAPORATOR MOTOR STARTER PROTECTOR
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NEUTRAL: WHITE #16 AWG
DC CONTROL: BLUE #16 AWG

ALL WIRE ENDS TO HAVE CRIMP TERMINALS OR FERRULES

EXTERNAL 3 PHASE CABLE COLOR CODE

T1: BLACK
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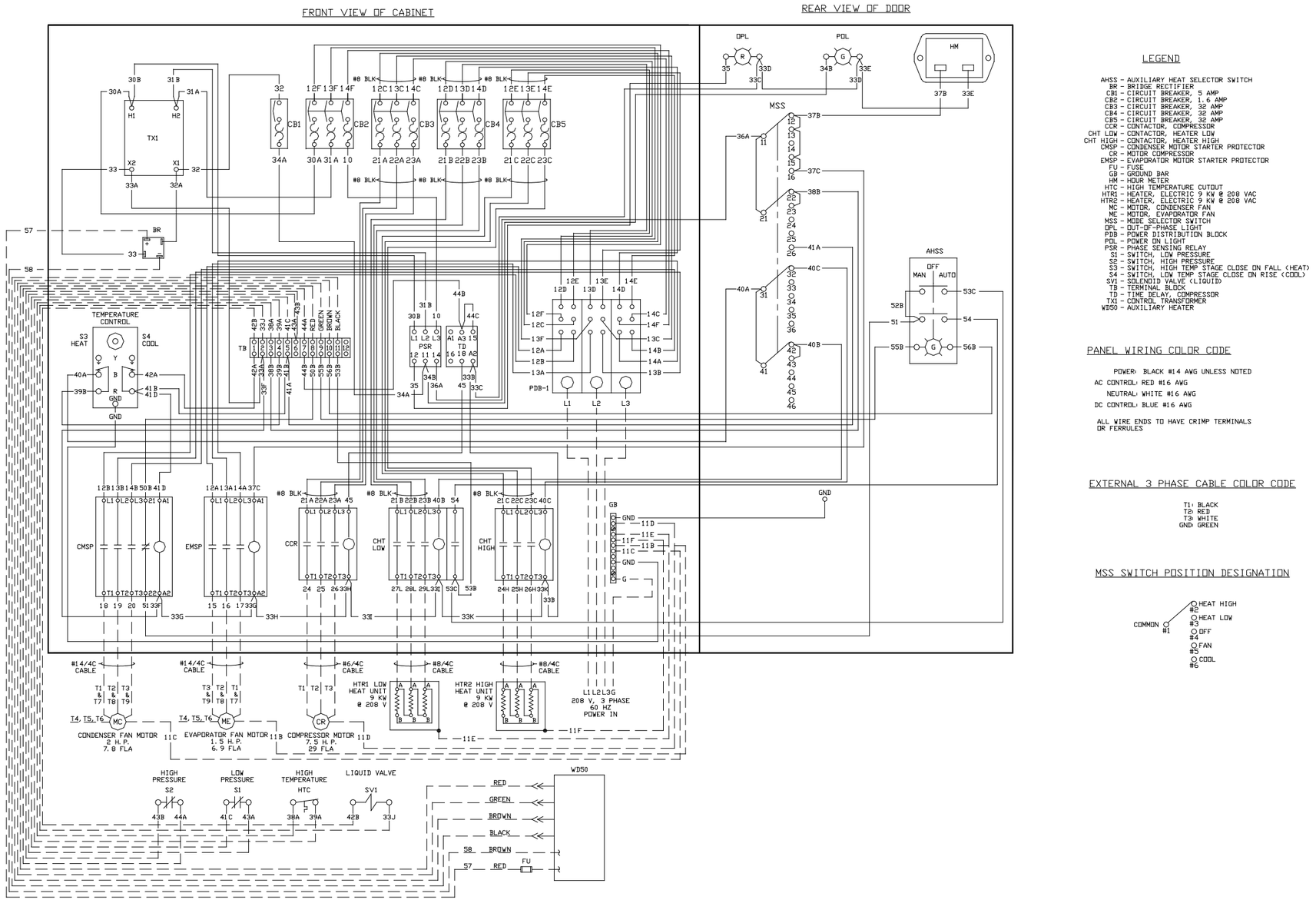
T3: WHITE
GND: GREEN

MODE SELECT SWITCH CONTACT POSITIONS (MSS)

XOOOOO: HEAT HIGH
OXOOOO: HEAT LOW
OOXOOO: OFF
OOOXOO: FAN
OOOOXO: COOL

Figure FO-3. Schematic ECU (V2)

FP-5/FP-6 blank



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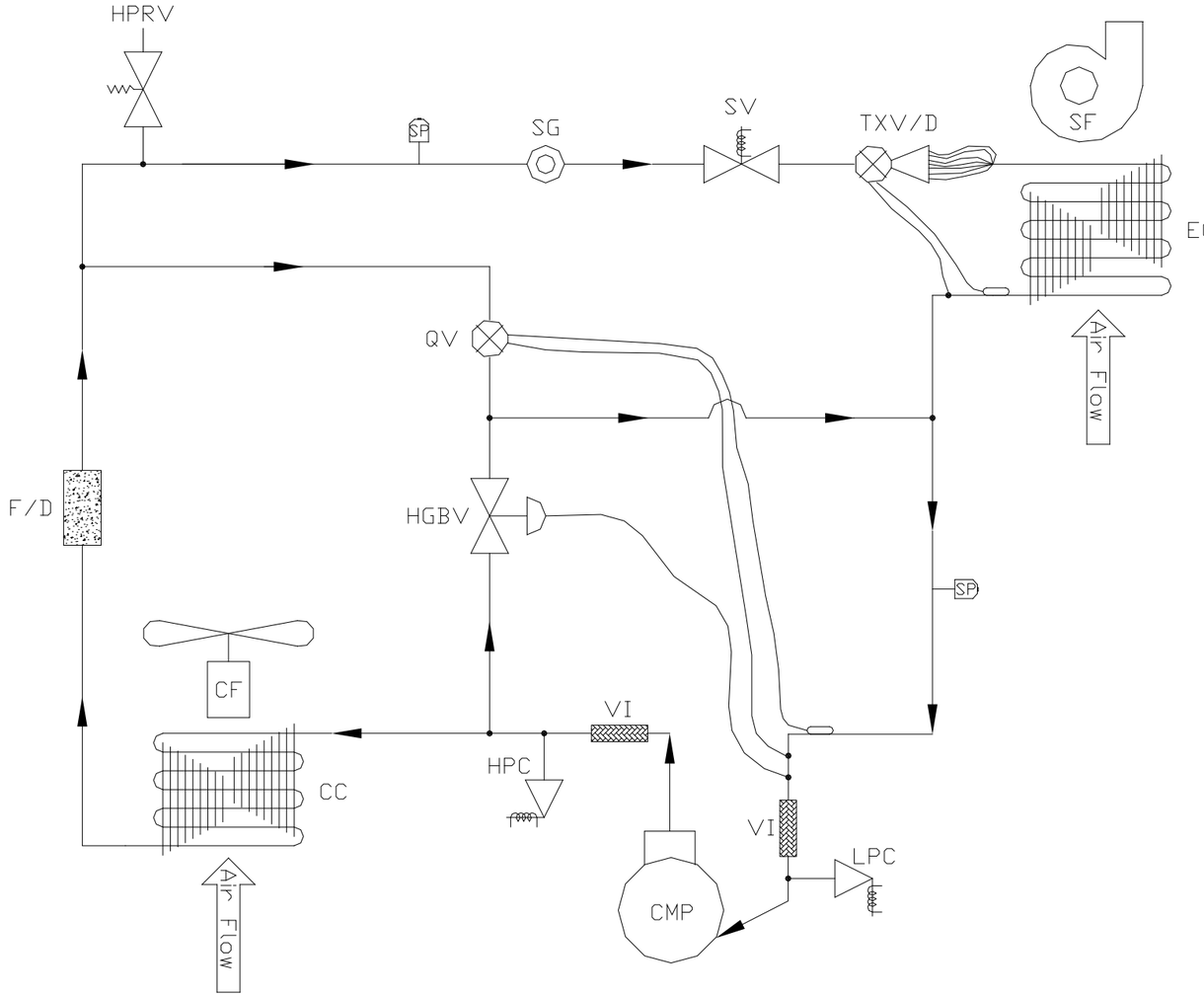
GND: GREEN

MSS SWITCH POSITION DESIGNATION

Figure FO-4. Wiring Diagram ECU (V2)

FP-7/FP-8 blank



LEGEND	
CC	Condenser Coil
CF	Condensor Fan
CMP	Compressor
EC	Evaporator Coil
F/D	Filter/Dryer
HGBV	Hot Gas Bypass Valve
HPC	High Pressure Cutout
HPRV	High Pressure Relief Valve
LPC	Low Pressure Cutout
QV	Quench Valve
SF	Supply Fan
SG	Sight GLass
SP	External Service Port(Hi & Lo)
SV	Solenoid Valve
TXV/D	Thermal Expansion Valve & Distributor
VI	Vibration Insulator

Figure FO-5. Schematic ECU Refrigerant

FP-9/FP-10 blank

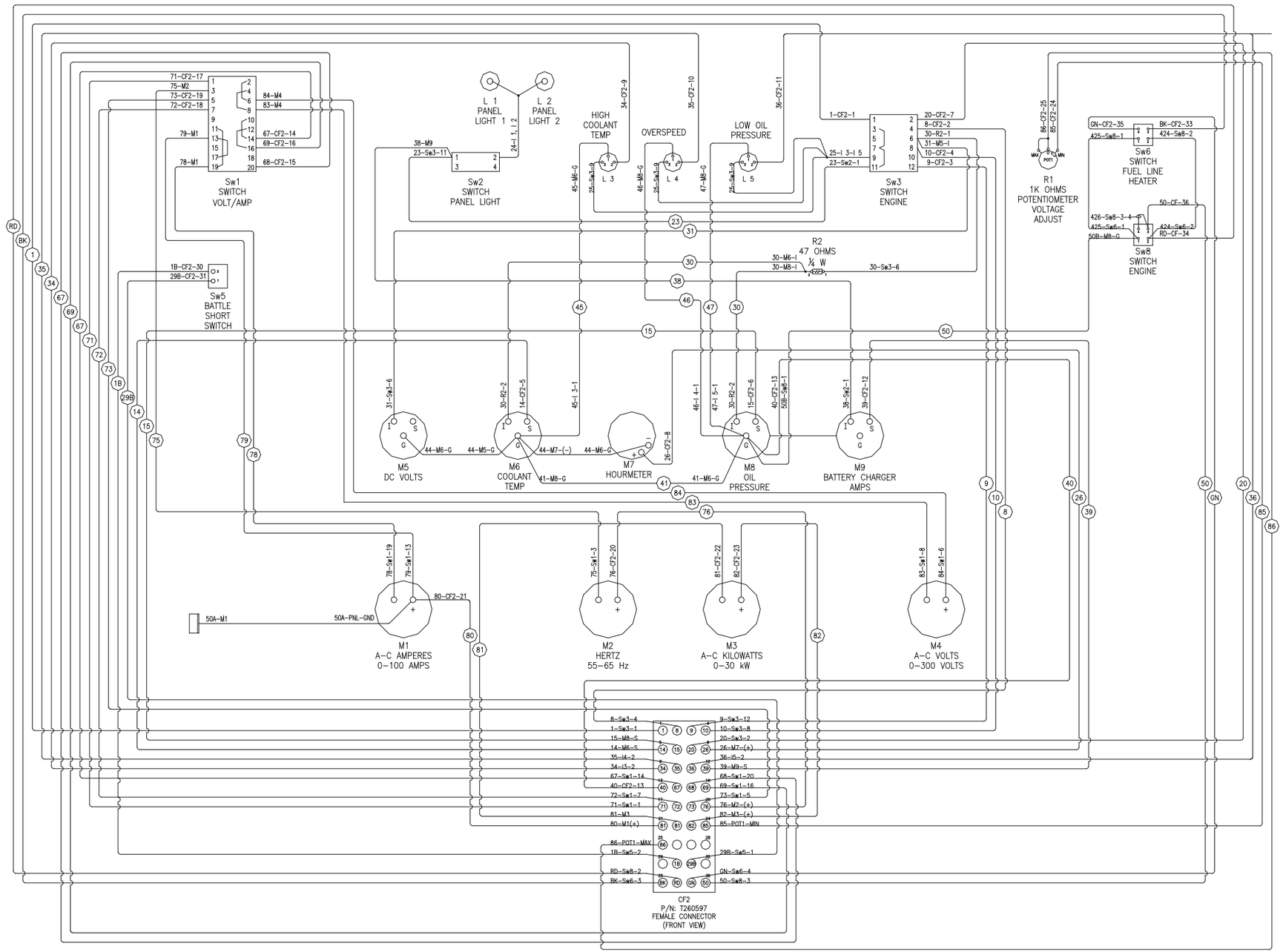


Figure FO-6. Schematic Genset Control Panel

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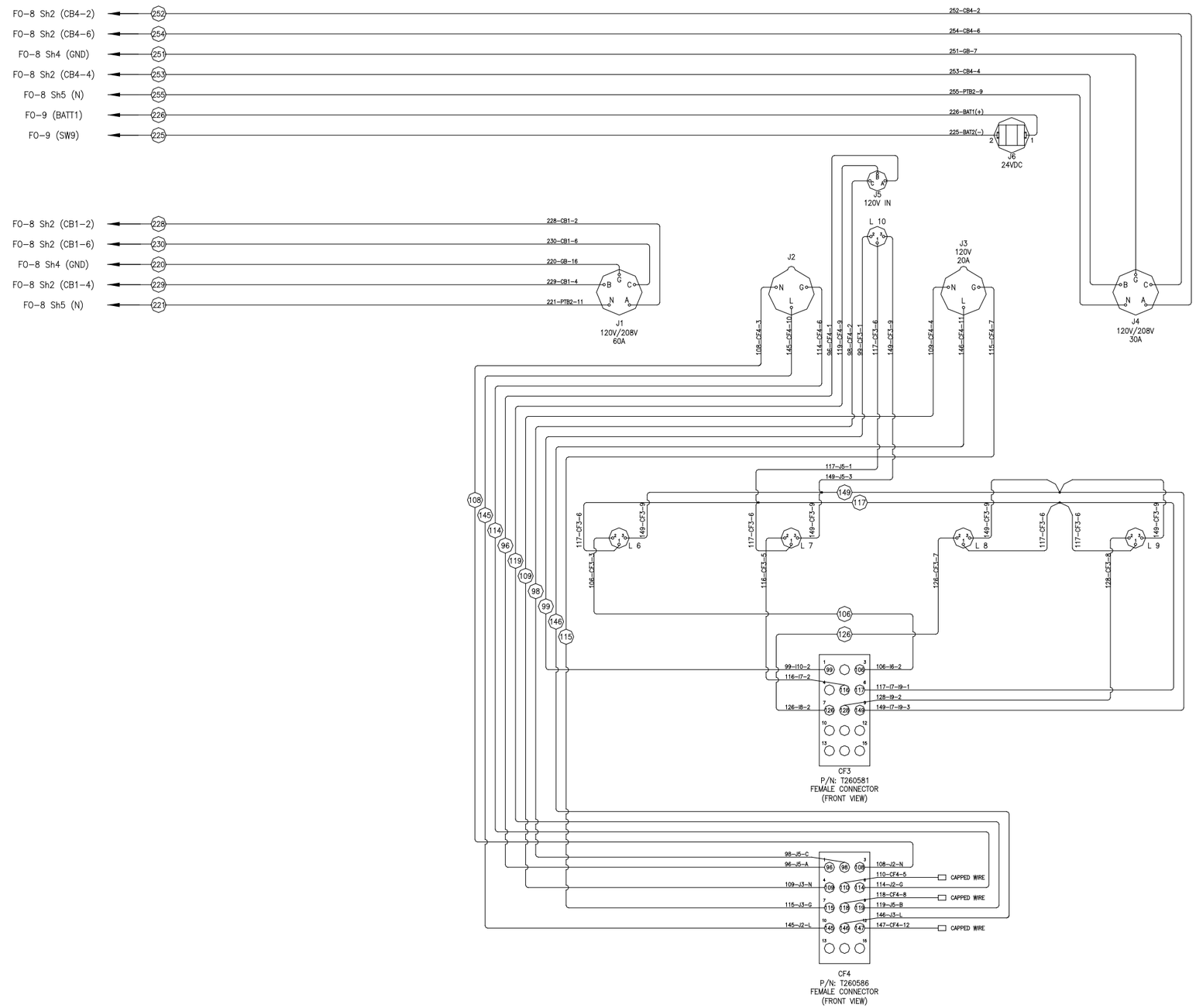

Figure FO-7. Schematic
Genset Power Distribution Panel

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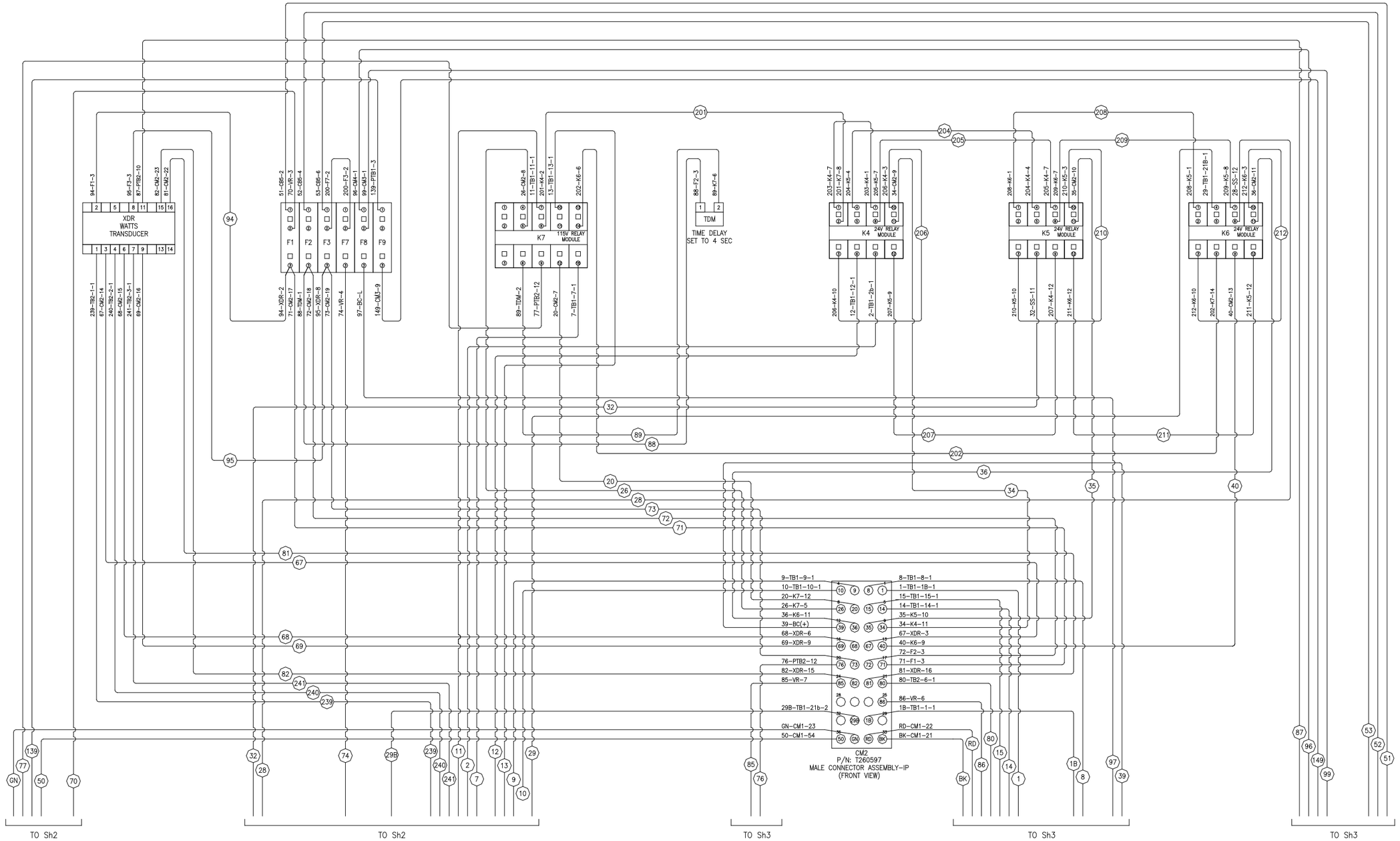

Figure FO-8. Schematic
Genset Barrier Panel
Sheet 1 of 5

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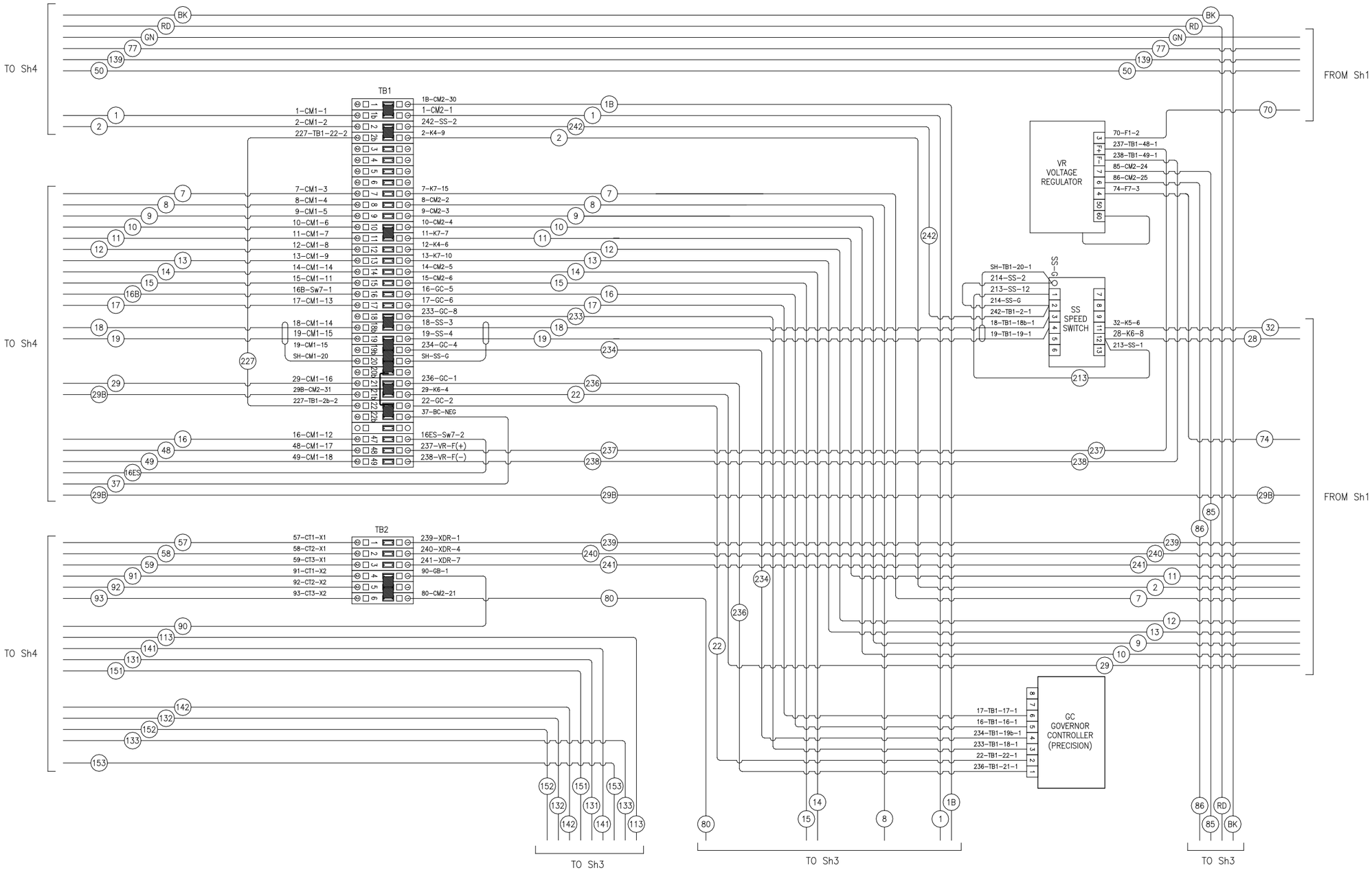

Figure FO-8. Schematic Genset Barrier Panel Sheet 2 of 5

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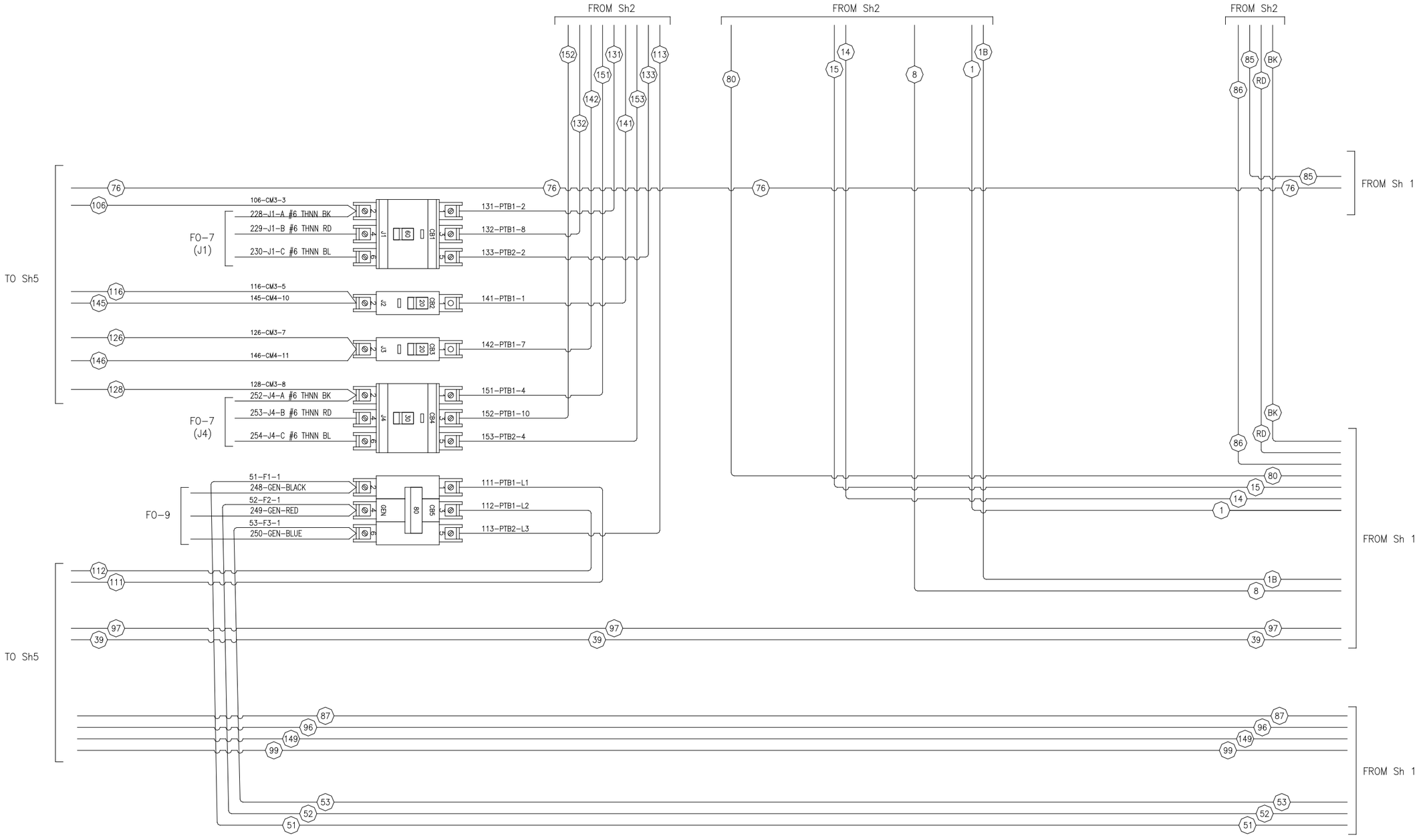

Figure FO-8. Schematic Genset Barrier Panel Sheet 3 of 5

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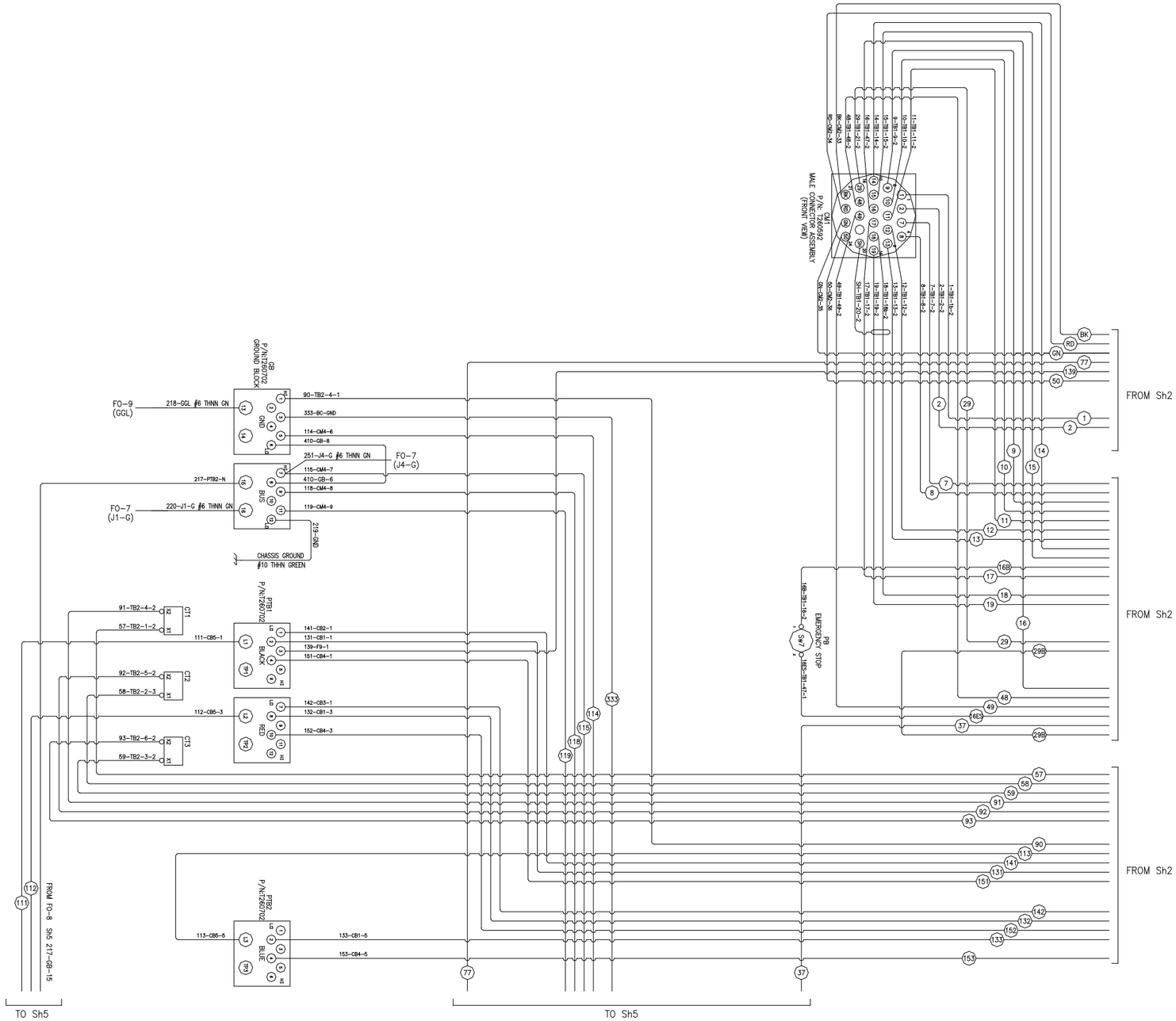

Figure FO-8. Schematic
Genset Barrier Panel
Sheet 4 of 5

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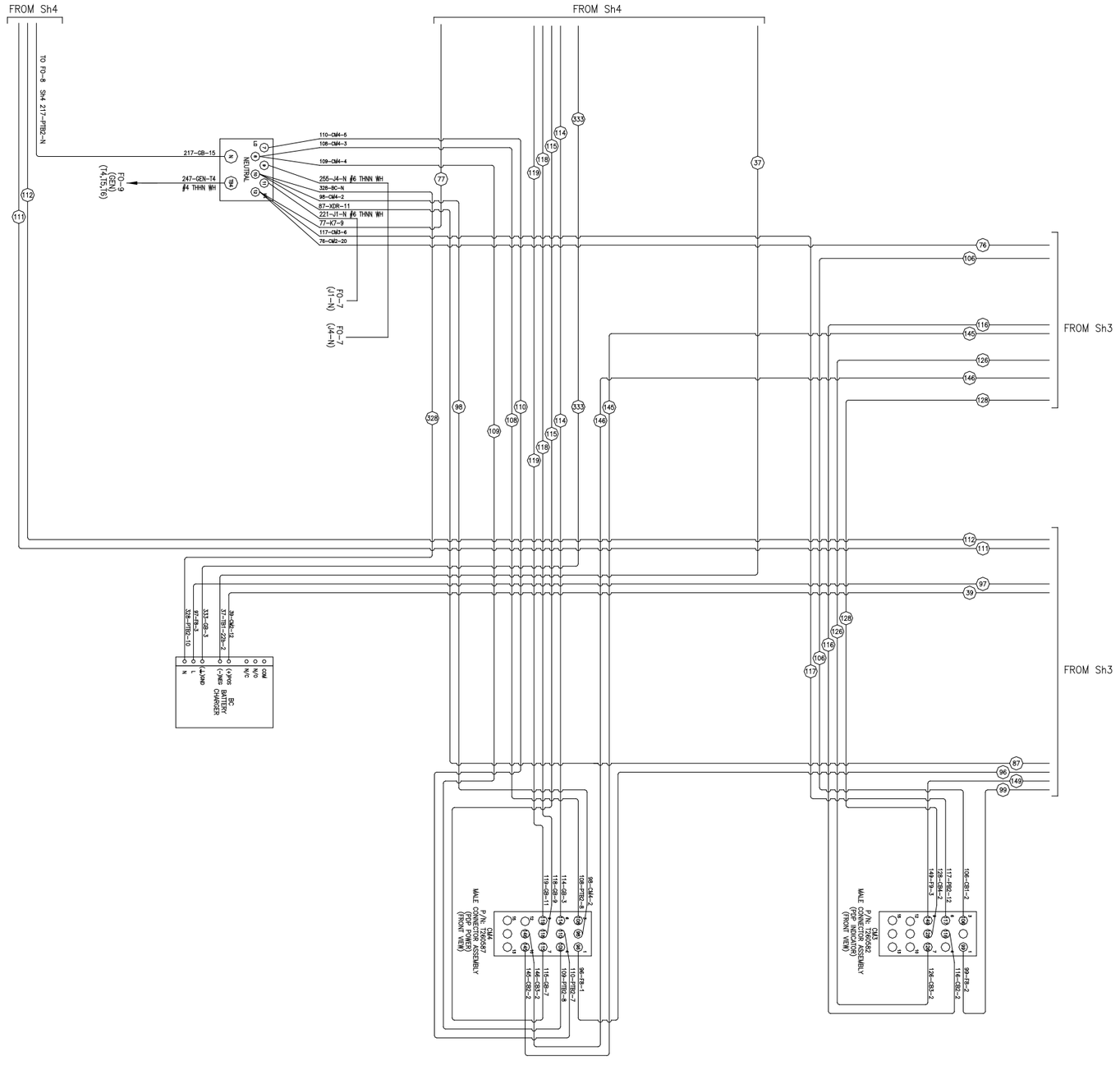

Figure FO-8. Schematic
Genset Barrier Panel
Sheet 5 of 5

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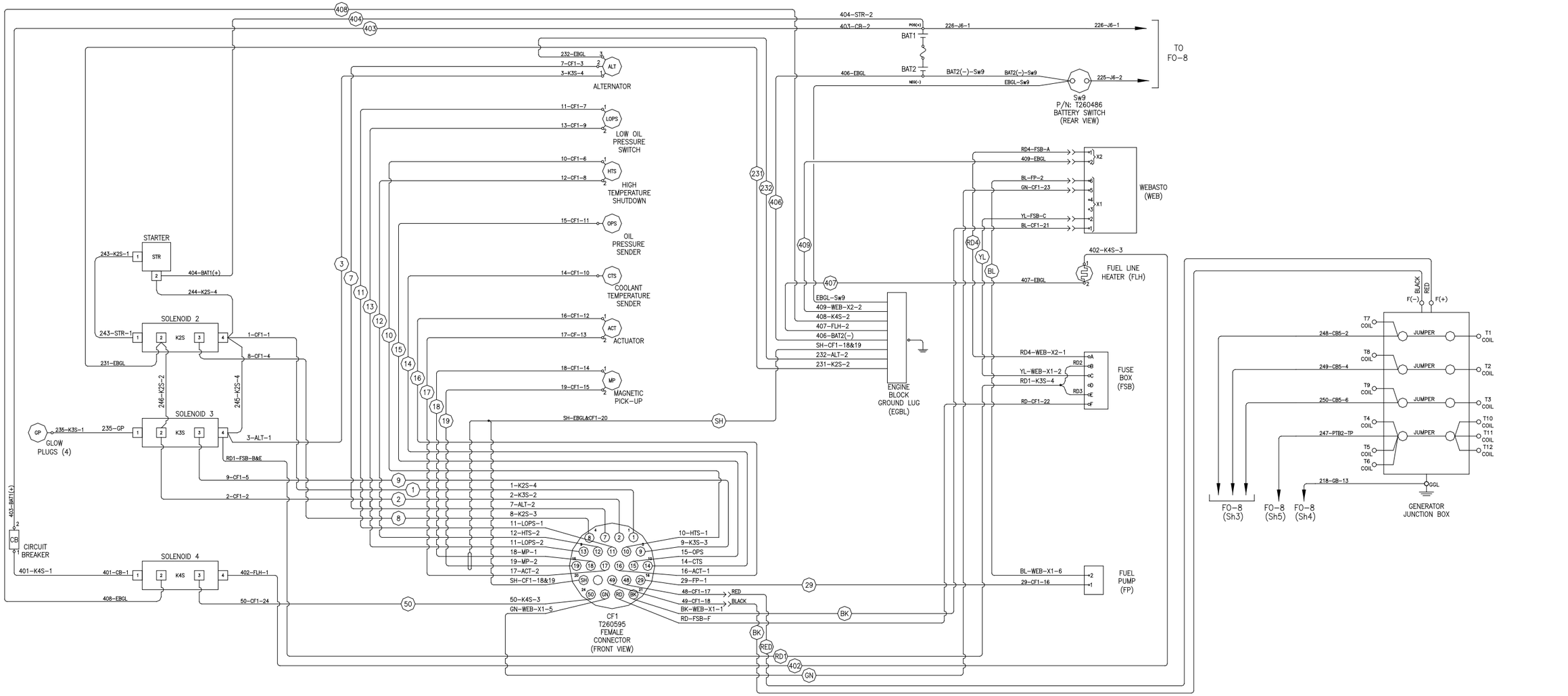

Figure FO-9. Schematic Genset Wiring Harness

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#	GAGE	COLOR	TO	FROM	TO	FROM	TO	FROM	TO	FROM
1	14	GRAY	K2S-4	CF1-1	CM1-1	TB1-1b-2	TB1-1-1	SW3-1	CM2	— — —
1B	16	GRAY	TB1-1-1	CM2-1	CF2-1	SW5-2	— — —	— — —	— — —	— — —
2	14	GRAY	K3S-2	CF1-2	CM1-2	TB1-2-2	TB1-2b-1	K4-9	— — —	— — —
3	14	GRAY	ALT-1	K3S-2	— — —	— — —	— — —	— — —	— — —	— — —
7	16	GRAY	ALT-2	CF1-3	CM1-3	TB1-7-2	TB1-7-1	K7-15	— — —	— — —
8	16	GRAY	K2S-3	CF1-4	CM1-4	TB1-8-2	TB1-8-1	CM2-2	CF2-2	SW3-4
9	16	GRAY	K3S-3	CF1-5	CM1-5	TB1-9-2	TB1-9-1	CM2-3	CF2-3	SW3-12
10	16	GRAY	HTS-1	CF1-6	CM1-6	TB1-10-2	TB1-10-1	CM2-4	CF2-4	SW3-8
11	16	GRAY	LOPS-1	CF1-7	CM1-7	TB1-11-2	TB1-11-1	K7-7	— — —	— — —
12	16	GRAY	HTS-2	CF1-8	CM1-8	TB1-12-2	TB1-12-1	K4-6	— — —	— — —
13	16	GRAY	LOPS-2	CF1-9	CM1-9	TB1-13-2	TB1-13-1	K7-10	— — —	— — —
14	16	GRAY	CTS	CF1-10	CM1-10	TB1-14-2	TB1-14-1	CM2-5	CF2-5	M6-(S)
15	16	GRAY	OPS	CF1-11	CM1-11	TB1-15-2	TB1-15-1	CM2-6	CF2-6	M8-(S)
16	16	BLACK	ACT-1	CF1-12	CM1-12	TB1-47-2	TB1-16-1	GC-5	— — —	— — —
16B	16	GRAY	TB1	S7	— — —	— — —	— — —	— — —	— — —	— — —
16ES	16	GRAY	TB1	S7	— — —	— — —	— — —	— — —	— — —	— — —
17	18	WHITE	ACT-2	CF1-13	CM1-13	TB1-17-2	TB1-17-1	GC-6	— — —	— — —
18	18	RED	MP-1	CF1-14	CM1-14	TB1-18b-2	TB1-18b-1	SS-3	— — —	— — —
19	18	BLACK	MP-2	CF1-15	CM1-15	TB1-19-2	TB1-19-1	SS-4	— — —	— — —
SH	18		CM1-20	TB1-20-1	TB1-20-2	SS-G	NOTE: ENCOMPASSES 18, 19			— — —
20	16	GRAY	K7-12	CM2-7	CF2-7	— — —	— — —	— — —	— — —	— — —
22	16	WHITE	TB1-22-1	GC-2	— — —	— — —	— — —	— — —	— — —	— — —
23	16	GRAY	SW2-1	SW3-11	— — —	— — —	— — —	— — —	— — —	— — —
24	16	GRAY	S2-2	I 1	S2-2	I 2	— — —	— — —	— — —	— — —
25	16	GRAY	S3-9	I 3-3	S3-9	I 4-3	S3-9	I 5-3	— — —	— — —
26	16	GRAY	M7 (+)	CF2-8	CM2-8	K7-5	— — —	— — —	— — —	— — —
28	16	GRAY	SS-12	K6-8	— — —	— — —	— — —	— — —	— — —	— — —
29	16	GRAY	FP	CF1-16	CM1-16	TB1-21-2	TB1-21B-1	K6-4	— — —	— — —
29B	16	GRAY	TB1-21b-2	CM2-31	CF2-31	SW5-1	— — —	— — —	— — —	— — —
30	16	GRAY	S3-6	M8 (I)	S3-6	M6 (I)	— — —	— — —	— — —	— — —
31	14	GRAY	S3-6	M5 (I)	— — —	— — —	— — —	— — —	— — —	— — —
32	16	GRAY	SS-11	K5-6	— — —	— — —	— — —	— — —	— — —	— — —
34	16	GRAY	K4-11	CM2-9	CF2-9	I 3-2	— — —	— — —	— — —	— — —
35	16	GRAY	K5-11	CM2-10	CF2-10	I 4-2	— — —	— — —	— — —	— — —
36	16	GRAY	K6-11	CM2-11	CF2-11	I 5-2	— — —	— — —	— — —	— — —
37	14	GRAY	BC (-)	TB1-22b-1	— — —	— — —	— — —	— — —	— — —	— — —
38	16	GRAY	S2 (-)	M9 (I)	— — —	— — —	— — —	— — —	— — —	— — —
39	14	GRAY	M9 (S)	BC (+)	— — —	— — —	— — —	— — —	— — —	— — —
40	16	GRAY	K6-9	CM2-13	CF2-13	M8 (G)	— — —	— — —	— — —	— — —
41	16	GRAY	M6 (G)	M8 (G)	— — —	— — —	— — —	— — —	— — —	— — —
44	16	GRAY	M5 (G)	M6 (G)	M6 (G)	M7 (-)	— — —	— — —	— — —	— — —
45	16	GRAY	M6 (G)	I 3-1	— — —	— — —	— — —	— — —	— — —	— — —
46	16	GRAY	M8 (G)	I 4-1	— — —	— — —	— — —	— — —	— — —	— — —
47	16	GRAY	M8 (G)	I 5-1	— — —	— — —	— — —	— — —	— — —	— — —
48	16	BLACK	TB1-48-2	CM1-17	CF1-17	GEN (+)	— — —	— — —	— — —	— — —
49	16	WHITE	TB1-49-2	CM1-18	CF1-18	GEN (-)	— — —	— — —	— — —	— — —
50	16	GRAY	K4S-3	CM1-24	CF1-24	CM2-36	CF2-36	K4S-3	— — —	— — —
50A	16	GRAY	M1 (+)	INST. DOOR	— — —	— — —	— — —	— — —	— — —	— — —
50B	16	GRAY	M8 (G)	SW8-1	— — —	— — —	— — —	— — —	— — —	— — —
51	16	GRAY	F1-1	CB5-1	— — —	— — —	— — —	— — —	— — —	— — —
52	16	GRAY	F2-1	CB5-3	— — —	— — —	— — —	— — —	— — —	— — —
53	16	GRAY	F3-1	CB5-5	— — —	— — —	— — —	— — —	— — —	— — —
57	16	BLACK	TB2-1-2	CT1-X1	— — —	— — —	— — —	— — —	— — —	— — —
58	16	RED	TB2-2-3	CT2-X1	— — —	— — —	— — —	— — —	— — —	— — —
59	16	BLUE	TB2-3-2	CT3-X1	— — —	— — —	— — —	— — —	— — —	— — —
67	16	GRAY	SW1-14	CF2-14	CM2-14	XDR-3	— — —	— — —	— — —	— — —
68	16	GRAY	SW1-20	CF2-15	CM2-15	CDR-6	— — —	— — —	— — —	— — —
69	16	GRAY	SW1-16	CF2-16	CM2-16	XDR-9	— — —	— — —	— — —	— — —

#	GAGE	COLOR	TO	FROM	TO	FROM	TO	FROM	TO	FROM
70	16	GRAY	F1-2	VR-3	— — —	— — —	— — —	— — —	— — —	— — —
71	16	GRAY	F1-2	CM2-17	CF2-17	SW1-1	— — —	— — —	— — —	— — —
72	16	GRAY	F2-2	CM2-18	CF2-18	SW1-7	— — —	— — —	— — —	— — —
73	16	GRAY	F3-2	CM2-19	CF2-19	SW1-5	— — —	— — —	— — —	— — —
74	16	GRAY	F7-2	VR-4	— — —	— — —	— — —	— — —	— — —	— — —
75	16	GRAY	SW1-3	M2-1	— — —	— — —	— — —	— — —	— — —	— — —
76	16	GRAY	PTB2-12	CM2-20	CF2-20	M2 (+)	— — —	— — —	— — —	— — —
77	16	GRAY	PTB2-12	K7-9	— — —	— — —	— — —	— — —	— — —	— — —
78	16	GRAY	M1	SW1-19	— — —	— — —	— — —	— — —	— — —	— — —
79	16	GRAY	M1 (+)	SW1-13	— — —	— — —	— — —	— — —	— — —	— — —
80	16	GRAY	M1 (+)	CF2-21	CM2-21	TB2-6-1	— — —	— — —	— — —	— — —
81	16	GRAY	M3	CF2-22	CM2-22	XDR-16	— — —	— — —	— — —	— — —
82	16	GRAY	M3	CF2-23	CM2-23	XDR-15	— — —	— — —	— — —	— — —
83	16	GRAY	M4	SW1-8	— — —	— — —	— — —	— — —	— — —	— — —
84	16	GRAY	M4	SW1-6	— — —	— — —	— — —	— — —	— — —	— — —
85	16	BLACK	R1-MIN	CF3-24	CM3-24	VR-7	— — —	— — —	— — —	— — —
86	16	WHITE	R1-MAX	CF3-25	CM3-25	VR-6	— — —	— — —	— — —	— — —
87	16	GRAY	PTB2-10	XDR-11	— — —	— — —	— — —	— — —	— — —	— — —
88	16	GRAY	F2-3	TDM-1	— — —	— — —	— — —	— — —	— — —	— — —
89	16	GRAY	K7-6	TDM-2	— — —	— — —	— — —	— — —	— — —	— — —
90	12	GREEN	TB2-4-1	GB-1	— — —	— — —	— — —	— — —	— — —	— — —
91	16	GREEN	TB2-4-2	CT1-X2	— — —	— — —	— — —	— — —	— — —	— — —
92	16	GREEN	TB2-5-2	CT2-X2	— — —	— — —	— — —	— — —	— — —	— — —
93	16	GREEN	TB2-6-2	CT3-X2	— — —	— — —	— — —	— — —	— — —	— — —
94	16	GRAY	F1-3	XDR-2	— — —	— — —	— — —	— — —	— — —	— — —
95	16	GRAY	F3-3	XDR-8	— — —	— — —	— — —	— — —	— — —	— — —
96	16	GRAY	F8-1	CM4-1	CF4-1	J5-B	— — —	— — —	— — —	— — —
97	16	GRAY	BC-L	F8-3	— — —	— — —	— — —	— — —	— — —	— — —
98	16	GRAY	PTB-10	CM4-2	CF4-2	J5-C	— — —	— — —	— — —	— — —
99	16	GRAY	F8-2	CM3-1	CF3-1	I 10-2	— — —	— — —	— — —	— — —
106	16	GRAY	CB1-2	CM3-3	CF3-3	I 6-2	— — —	— — —	— — —	— — —
108	12	WHITE	PTB2-8	CM4-3	CF4-3	J2-N	— — —	— — —	— — —	— — —
109	12	WHITE	PTB2-8	CM4-4	CF4-4	J3-N	— — —	— — —	— — —	— — —
110	6	WHITE	PTB2-8	CM4-5	CF4-5	CAPPED	— — —	— — —	— — —	— — —
111	6	BLACK	PTB1-L1	CB5-2	— — —	— — —	— — —	— — —	— — —	— — —
112	6	RED	PTB1-L2	CB5-4	— — —	— — —	— — —	— — —	— — —	— — —
113	6	BLUE	PTB2-L3	CB5-6	— — —	— — —	— — —	— — —	— — —	— — —
114	12	GREEN	J2-G	CM4-6	CF4-6	GB-3	— — —	— — —	— — —	— — —
115	12	GREEN	J3-G	CM4-7	CF4-7	GB-5	— — —	— — —	— — —	— — —
116	16	GRAY	CB2-2	CM3-5	CF3-5	I 7-2	— — —	— — —	— — —	— — —
117	16	GRAY	PTB2-12	CM3-6	CF3-6	I 6-1	I 7-1	I 8-1	I 9-1	I 10-1
118	6	GREEN	GB-9	CM4-7	CF4-7	CAPPED	— — —	— — —	— — —	— — —
119	12	GREEN	GB-11	CM4-9	CF4-9	J5-B	— — —	— — —	— — —	— — —
126	16	GRAY	CB3-2	CM3-7	CF3-7	I 8-2	— — —	— — —	— — —	— — —
128	16	GRAY	CB4-2	CM3-8	CF3-8	I 9-2	— — —	— — —	— — —	— — —
131	6	BLACK	CB1-1	PTB1-2	— — —	— — —	— — —	— — —	— — —	— — —
132	6	RED	CB1-3	PTB1-8	— — —	— — —	— — —	— — —	— — —	— — —
133	6	BLUE	CB1-5	PTB2-2						
139	16	GRAY	F9-1	PTB1-3	— — —	— — —	— — —	— — —	— — —	— — —
141	12	BLACK	CB2-1	PTB1-1	— — —	— — —	— — —	— — —	— — —	— — —
142	12	RED	CB3-1	PTB1-7	— — —	— — —	— — —	— — —	— — —	— — —
145	12	BLACK	CB2-2	CM4-10	CF4-10	J2-L	— — —	— — —	— — —	— — —
146	12	RED	CB3-2	CM4-11	CF4-11	J3-L	— — —	— — —	— — —	— — —
149	16	GRAY	F9-3	CM3-9	CF3-9	I 6-3	I 7-3	I 8-3	I 9-3	I 10-3
151	6	BLACK	CB4-1	PTB1-4	— — —	— — —	— — —	— — —	— — —	— — —
152	6	RED	CB4-3	PTB1-10	— — —	— — —	— — —	— — —	— — —	— — —
153	6	BLUE	CB4-5	PTB2-4	— — —	— — —	— — —	— — —	— — —	— — —

Figure FO-10. Wire List
Genset
Sheet 1 of 2
FP-27/FP-28 blank

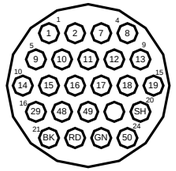
#	GAGE	COLOR	TO	FROM	TO	FROM	TO	FROM	TO	FROM
200	16	GRAY	F3-2	F7-2	— — —	— — —	— — —	— — —	— — —	— — —
201	16	GRAY	K7-8	K4-2	— — —	— — —	— — —	— — —	— — —	— — —
202	16	GRAY	K7-14	K6-6	— — —	— — —	— — —	— — —	— — —	— — —
203	16	GRAY	K4-7	K4-1	— — —	— — —	— — —	— — —	— — —	— — —
204	16	GRAY	K4-4	K5-4	— — —	— — —	— — —	— — —	— — —	— — —
205	16	GRAY	K4-7	K5-7	— — —	— — —	— — —	— — —	— — —	— — —
206	16	GRAY	K4-3	K4-10	— — —	— — —	— — —	— — —	— — —	— — —
207	16	GRAY	K4-12	K5-9	— — —	— — —	— — —	— — —	— — —	— — —
208	16	GRAY	K5-1	K6-1	— — —	— — —	— — —	— — —	— — —	— — —
209	16	GRAY	K5-8	K6-7	— — —	— — —	— — —	— — —	— — —	— — —
210	16	GRAY	K5-3	K5-10	— — —	— — —	— — —	— — —	— — —	— — —
211	16	GRAY	K5-12	K6-12	— — —	— — —	— — —	— — —	— — —	— — —
212	16	GRAY	K6-3	K6-10	— — —	— — —	— — —	— — —	— — —	— — —
213	16	GRAY	SS-1	SS-12	— — —	— — —	— — —	— — —	— — —	— — —
214	16	GRAY	SS-2	SS-G	— — —	— — —	— — —	— — —	— — —	— — —
217	6	GREEN	PTB2-N	GB-15	— — —	— — —	— — —	— — —	— — —	— — —
218	6	GREEN	GB-13	GGL-GND	— — —	— — —	— — —	— — —	— — —	— — —
SH	— —		GB-2	GGL-GND	NOTE: ENCOMPASSES 218, 247, 248, 249, 250					— — —
219	10	GREEN	GB-L2	CHASSIS	— — —	— — —	— — —	— — —	— — —	— — —
220	6	GREEN	GB-16	J1-G	— — —	— — —	— — —	— — —	— — —	— — —
SH	— —		J1-BOLT	CB-4	NOTE: ENCOMPASSES 220, 221, 226, 228, 230					— — —
221	6	BLK#4	PTB2-11	J1-N	— — —	— — —	— — —	— — —	— — —	— — —
225	2	BLACK	J6-2	BATT 2(-)	— — —	— — —	— — —	— — —	— — —	— — —
226	2	RED	J6-1	BATT 1(-)	— — —	— — —	— — —	— — —	— — —	— — —
227	16	GRAY	TB1-2b-2	TB1-22-2	— — —	— — —	— — —	— — —	— — —	— — —
228	6	BLK#1	CB1-2	J1-A	— — —	— — —	— — —	— — —	— — —	— — —
229	6	BLK#2	CB1-4	J1-B	— — —	— — —	— — —	— — —	— — —	— — —
230	6	BLK#3	CB1-6	J1-C	— — —	— — —	— — —	— — —	— — —	— — —
231	10	GREEN	K2S-2	EBGL	— — —	— — —	— — —	— — —	— — —	— — —
232	10	GREEN	ALT-3	EBGL	— — —	— — —	— — —	— — —	— — —	— — —
233	16	BLACK	TB1-18-1	GC-8	— — —	— — —	— — —	— — —	— — —	— — —
234	16	WHITE	TB1-19B-1	GC-4	— — —	— — —	— — —	— — —	— — —	— — —
235	14	GRAY	GP	K3S-1	— — —	— — —	— — —	— — —	— — —	— — —
236	16	GRAY	TB1-21-1	GC-1	— — —	— — —	— — —	— — —	— — —	— — —
237	16	BLACK	VR-F+	TB1-48-1	— — —	— — —	— — —	— — —	— — —	— — —
238	16	WHITE	VR-F-	TB1-49-1	— — —	— — —	— — —	— — —	— — —	— — —
239	16	GRAY	XDR-1	TB2-1-1	— — —	— — —	— — —	— — —	— — —	— — —
240	16	GRAY	XDR-4	TB2-2-1	— — —	— — —	— — —	— — —	— — —	— — —
241	16	GRAY	XDR-7	TB2-3-1	— — —	— — —	— — —	— — —	— — —	— — —
242	14	GRAY	TB1-2-1	SS-2	— — —	— — —	— — —	— — —	— — —	— — —
243	10	RED	K2S-1	STR-1	— — —	— — —	— — —	— — —	— — —	— — —
244	8	RED	K2S-4	STR-2	— — —	— — —	— — —	— — —	— — —	— — —
245	14	GRAY	K2S-4	K3S-4	— — —	— — —	— — —	— — —	— — —	— — —
246	16	GRAY	K2S-2	K3S-2	— — —	— — —	— — —	— — —	— — —	— — —
247	6	BLK#4	PTB2-TP4	GEN-T4	— — —	— — —	— — —	— — —	— — —	— — —
248	6	BLK#1	CB5-1	GEN-T7	— — —	— — —	— — —	— — —	— — —	— — —
249	6	BLK#2	CB5-3	GEN-T8	— — —	— — —	— — —	— — —	— — —	— — —
250	6	BLK#3	CB5-5	GEN-T9	— — —	— — —	— — —	— — —	— — —	— — —
251	6	GREEN	GB-7	J4-G	— — —	— — —	— — —	— — —	— — —	— — —
252	6	BLACK	CB4-2	J4-A	— — —	— — —	— — —	— — —	— — —	— — —
253	6	RED	CB4-4	J4-B	— — —	— — —	— — —	— — —	— — —	— — —
254	6	BLUE	CB4-6	J4-C	— — —	— — —	— — —	— — —	— — —	— — —
255	6	WHITE	PTB2-9	J4-N	— — —	— — —	— — —	— — —	— — —	— — —

#	GAGE	COLOR	TO	FROM	TO	FROM	TO	FROM	TO	FROM
328	16	GRAY	BC-N	PTB2-10	— — —	— — —	— — —	— — —	— — —	— — —
333	12	GREEN	BC-GND	GB-3	— — —	— — —	— — —	— — —	— — —	— — —
334	16	GRAY	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —

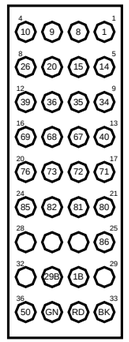
#	GAGE	COLOR	TO	FROM	TO	FROM	TO	FROM	TO	FROM
401		RED	CB-1	K4S-1	— — —	— — —	— — —	— — —	— — —	— — —
402		RED	K4S-4	FLH-1	— — —	— — —	— — —	— — —	— — —	— — —
403		RED	BAT 1 (+)	CB-2	— — —	— — —	— — —	— — —	— — —	— — —
404		RED	BAT 1 (+)	STR-2	— — —	— — —	— — —	— — —	— — —	— — —
406		BLACK	BAT 2(-)	EBGL	— — —	— — —	— — —	— — —	— — —	— — —
407		GREEN	FLH-2	EBGL	— — —	— — —	— — —	— — —	— — —	— — —
408		GREEN	K4S-2	EBGL	— — —	— — —	— — —	— — —	— — —	— — —
409		GREEN	WEB-2	EBGL	— — —	— — —	— — —	— — —	— — —	— — —
410		GREEN	GB-6	GB-8	— — —	— — —	— — —	— — —	— — —	— — —
424		RED	S6-2	S8-2	— — —	— — —	— — —	— — —	— — —	— — —
425		GRAY	S6-1	S8-1	— — —	— — —	— — —	— — —	— — —	— — —
426		GRAY	S8-4	S8-3	— — —	— — —	— — —	— — —	— — —	— — —

#	GAGE	COLOR	TO	FROM
BK		BLACK	WEB-X1-1	S6-3
GN		GREEN	WEB-X1-5	S6-4
RD		RED	FSB-F	S6-2
RD1		RED	K3S	RD2 RD3
RD2		RED	FSB-B	RD1
RD3		RED	FSB-E	RD1
RD4		RED	FSB-A	WEB-X2-1
YL		YELLOW	FSB-C	WEB-X1-2
BR		BROWN	409	WEB-X2-2
BR1		BROWN	409	FP-2
BL		BLUE	FP	WEB-X1-6

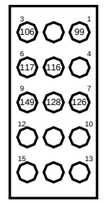
Figure FO-10. Wire List
Genset
Sheet 2 of 2
FP-29/FP-30 blank



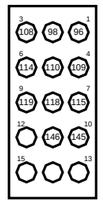
CM1
MALE CONNECTOR
(FRONT VIEW)



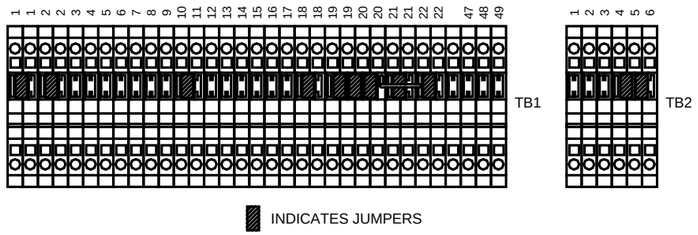
CM2
MALE CONNECTOR
(FRONT VIEW)



CM3
MALE CONNECTOR
(FRONT VIEW)

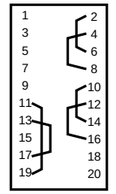


CM4
MALE CONNECTOR
(FRONT VIEW)



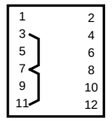
TERMINAL BLOCKS

BARRIER PANEL



Sw1
VOLTMETER/AMMETER
COMBO

Sw2
PANEL
LIGHT

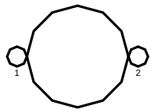


Sw3
ENGINE

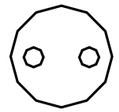
Sw5
BATTLE
SHORT
SWITCH

Sw8
SWITCH
HOT LINE

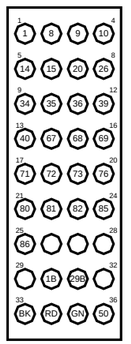
Sw6
ENGINE
HEATER



Sw7
EMERGENCY
STOP

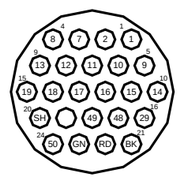


Sw9
BATTLE
SHORT



CF2
FEMALE CONNECTOR
(FRONT VIEW)

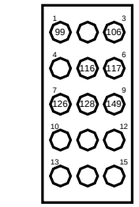
CONTROL PANEL



CF1
FEMALE CONNECTOR
(FRONT VIEW)

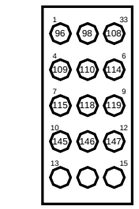
ENGINE HARNESS

Figure FO-11. Genset Connectors
Sheet 1 of 2
FP-31/FP-32 Blank

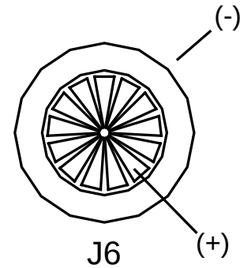


CF3
FEMALE CONNECTOR
(FRONT VIEW)

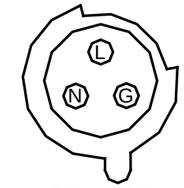
J1 & J4



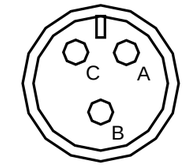
CF4
FEMALE CONNECTOR
(FRONT VIEW)



J6



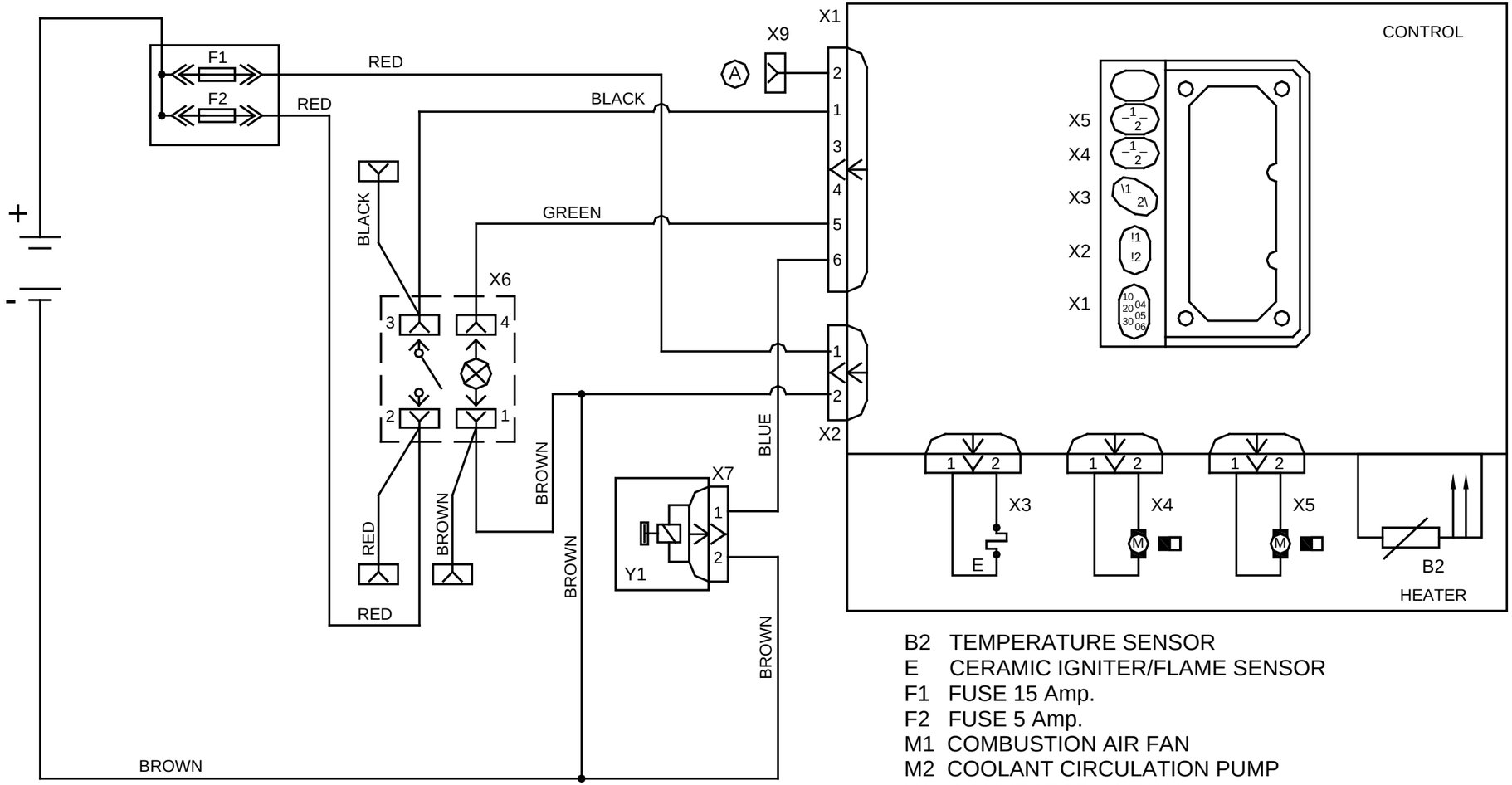
J2 & J3



J5

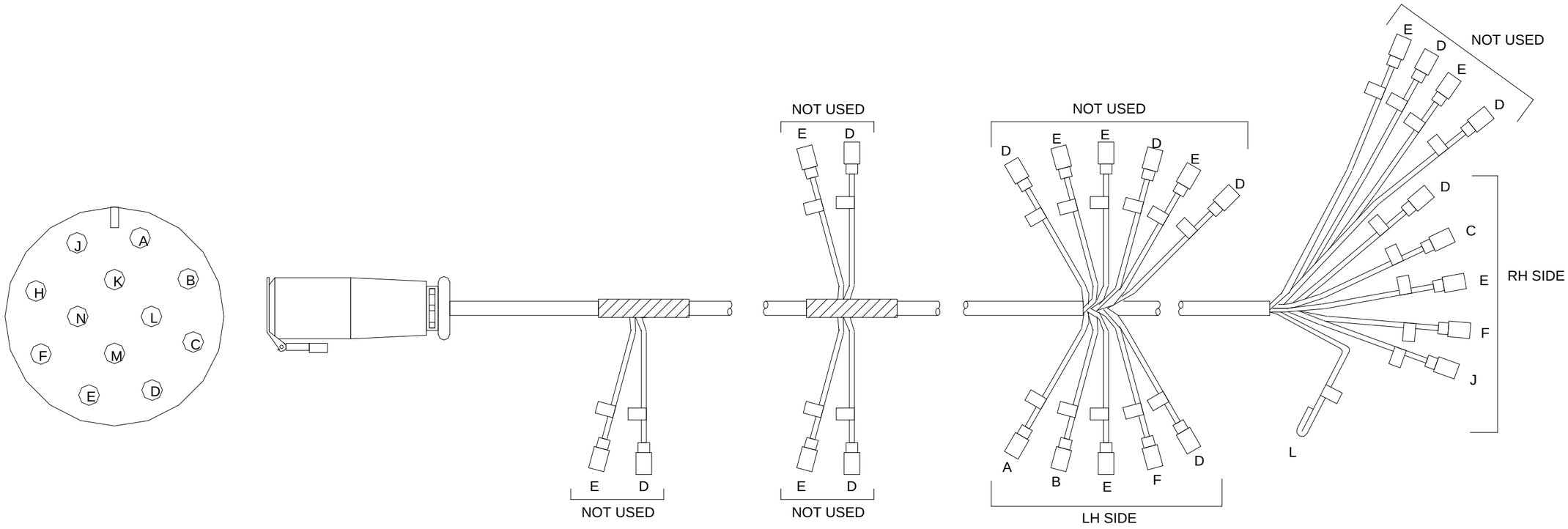
POWER DISTRIBUTION PANEL

Figure FO-11. Genset Connectors
Sheet 2 of 2
FP-33/FP-34 Blank



B2 TEMPERATURE SENSOR
E CERAMIC IGNITER/FLAME SENSOR
F1 FUSE 15 Amp.
F2 FUSE 5 Amp.
M1 COMBUSTION AIR FAN
M2 COOLANT CIRCULATION PUMP
X1 CONNECTOR - 6 WAY
X2 CONNECTOR - 2 WAY
X3 CONNECTOR - 2 WAY
X4 CONNECTOR - 2 WAY
X5 CONNECTOR - 2 WAY
X6 ON/OFF SWITCH
X7 CONNECTOR - 2 WAY
X8 CONNECTOR - 12 WAY
X9 CONNECTOR - 1 WAY
Y1 FUEL PUMP
Ⓐ COMPUTER DIAGNOSTICS DOWNLOAD LINK

Figure FO-12. Schematic Hydronic Heater



FROM (Vehicle connector)	TO (Tail-light connections)
A	LH Black-Out
B	LH Signal
C	RH Black-Out
D	Ground
E	Stop Lights
F	Black-Out Stop
H	Not Used
J	RH Signal
K	Not Used
L	Ground
M	Not Used
N	Not Used

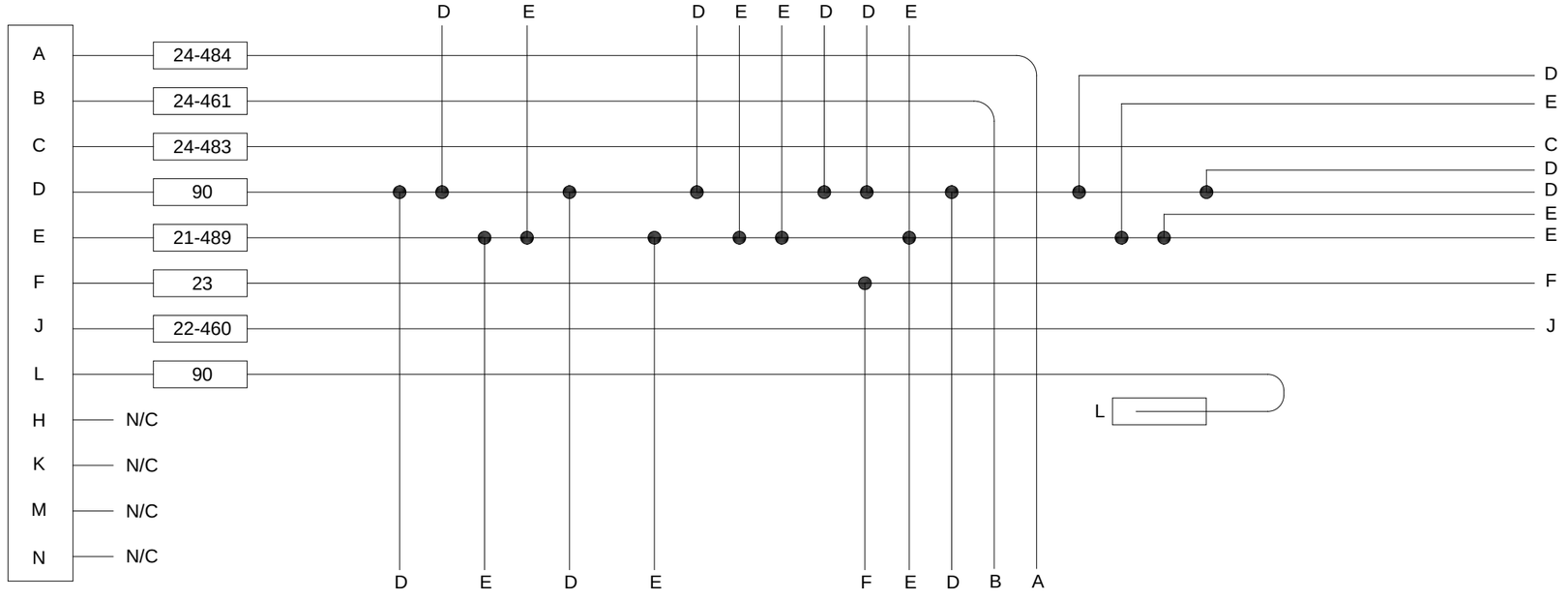
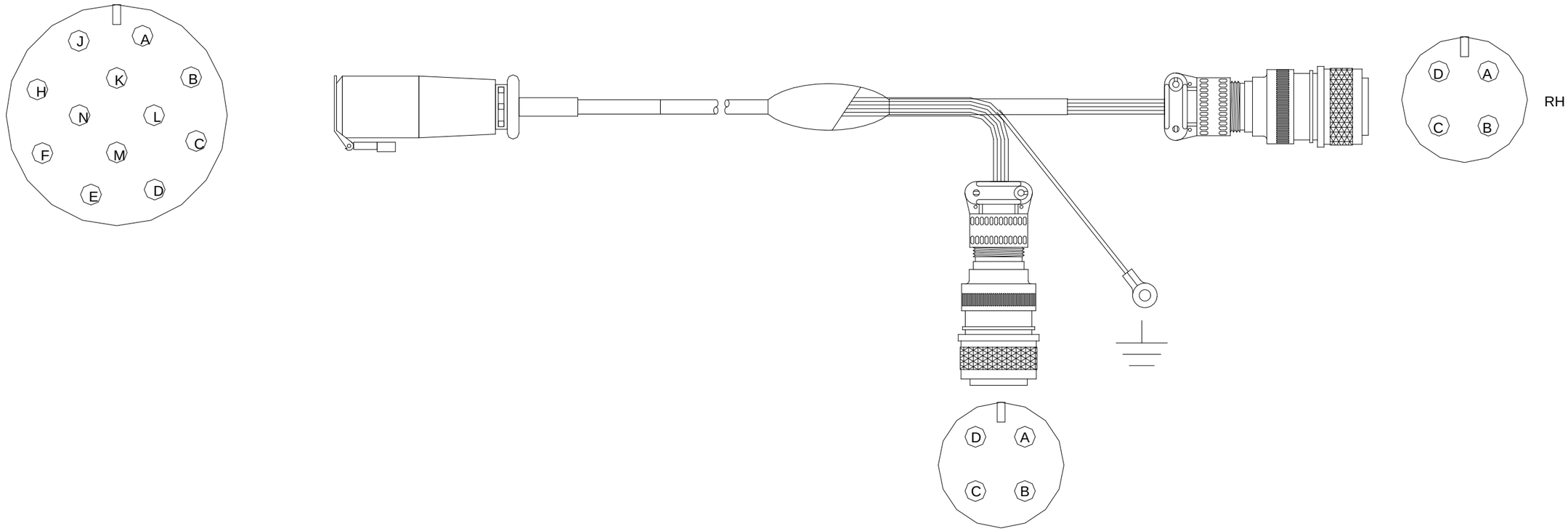


Figure FO-13. Wiring Diagram Inter-Vehicular cable (LED)

FP-37/FP-38 Blank



Cable Assembly/Stop Light (Incandescent) Connections

FROM (Vehicle connector)	CIRCUIT NUMBER	TO (Tail-light connections)	TO LH (Tail-light connections)	TO RH (Tail-light connections)
A	24-484	LH Black-Out	A	
B	24-461	LH Signal	B	
C	24-483	RH Black-Out		A
D	90	Ground		
E	21-489	Stop Lights	C	B
F	23	Black-Out Stop	D	C
H	N/C	Not Used		
J	22-460	RH Signal		D
K	N/C	Not Used		
L	90	Ground		
M	N/C	Not Used		
N	N/C	Not Used		

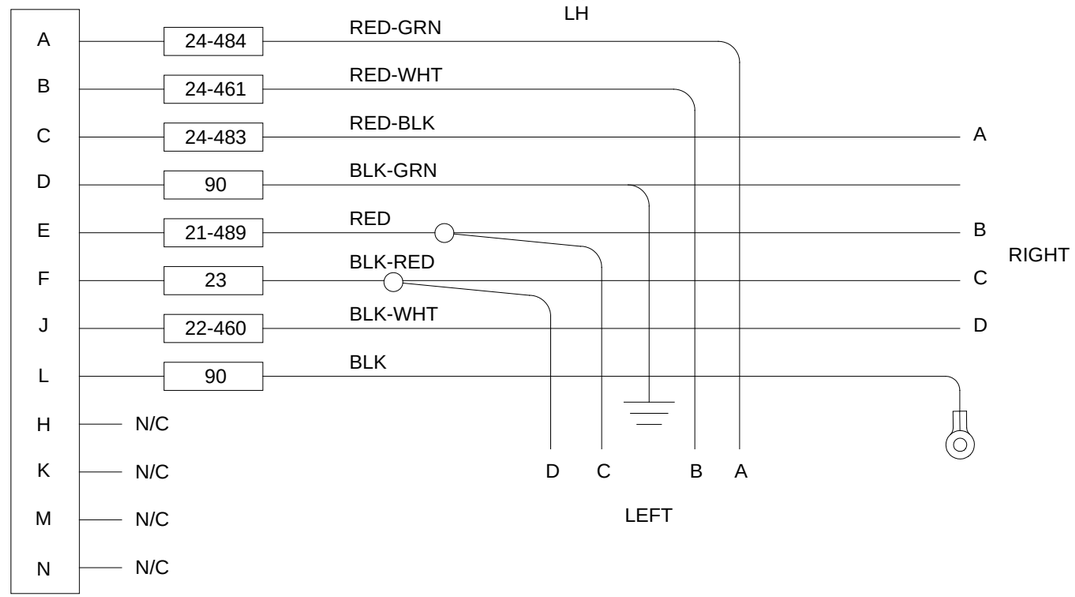


Figure FO-14. Schematic Wiring Diagram Inter-Vehicular cable (Incandescent)

FP-39/FP-40 Blank

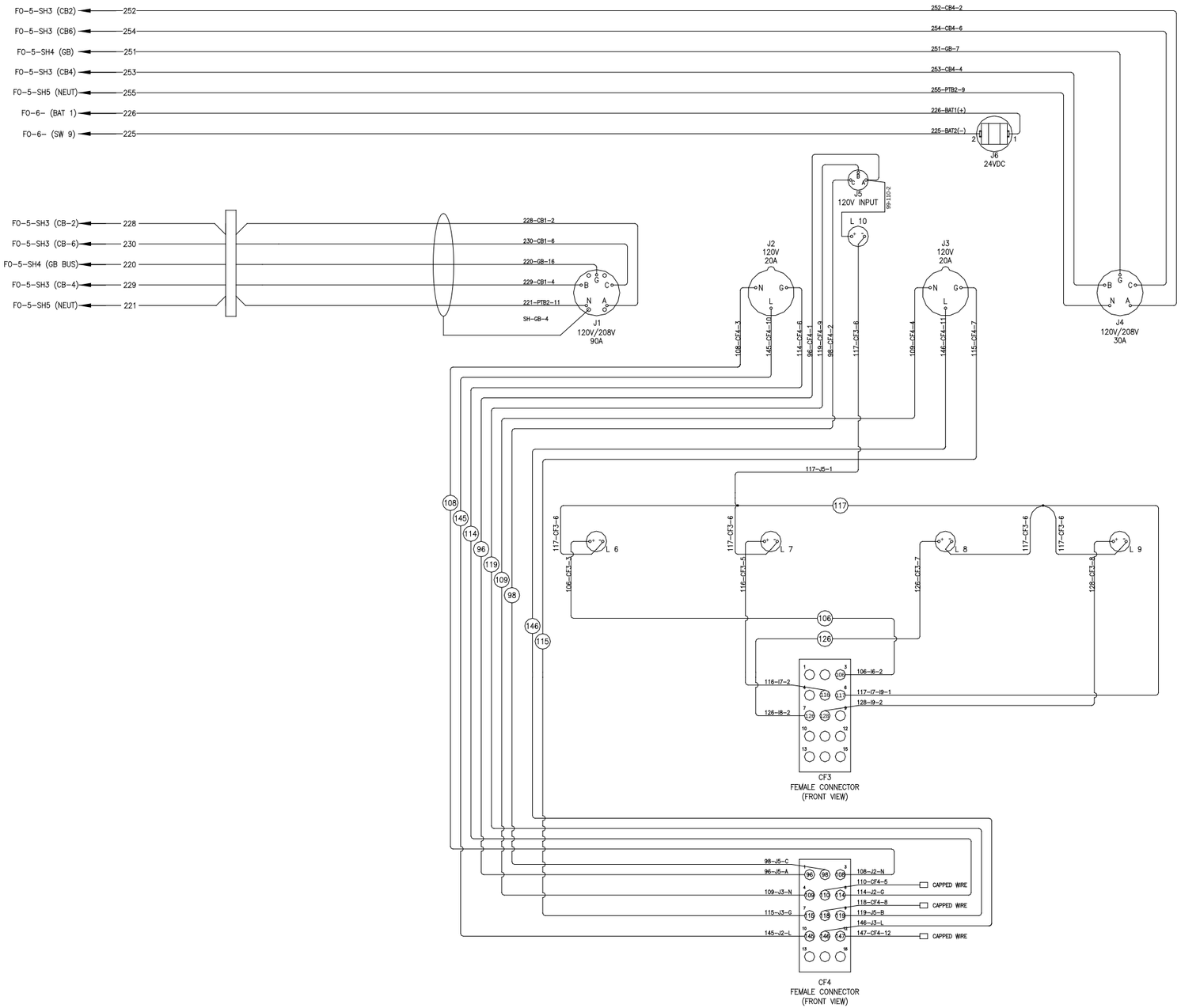


Figure FO-15. Schematic
Genset Power Distribution Panel
New Version (with EMI)
FP-41/FP-42 Blank

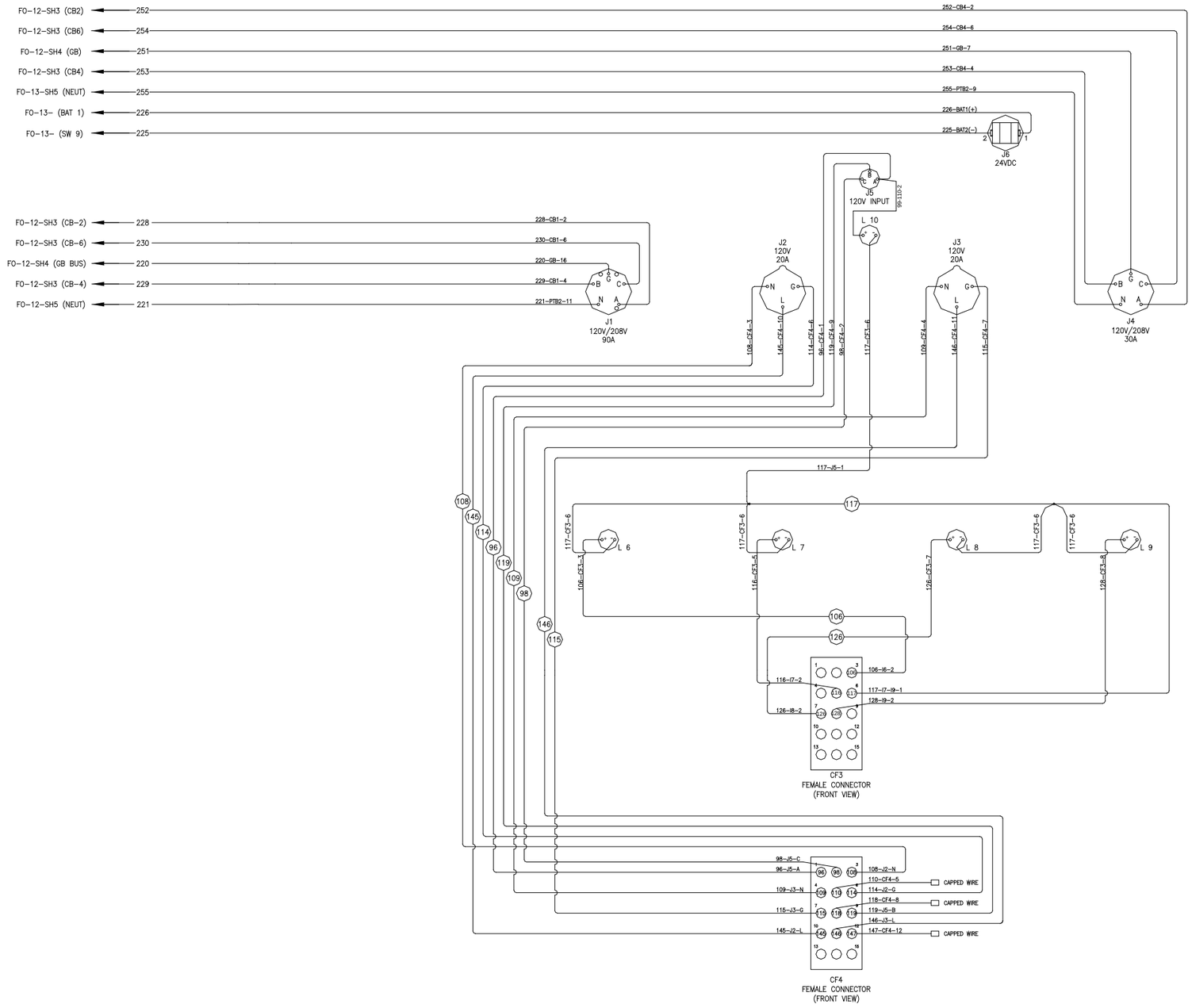


Figure FO-16. Schematic
Genset Power Distribution Panel
New Version (without EMI)

FP-43/FP-44 Blank

PIN: XXXXXX-000